Cisco UCS C260 Server Installation and Service Guide

Covers Server Generation M2

November 18, 2013

C O N T E N T S

Preface

This preface describes the audience, organization, and conventions of the *Cisco UCS C260 Server Installation and Service Guide*. It also provides information about how to obtain related documentation.

Related Documentation

The documentation set for the Cisco Unified Computing System (UCS) C-Series rack-mount servers is described in the roadmap document at the following link:

Cisco UCS C-Series Documentation Roadmap

Audience

This guide is for experienced network administrators who configure and maintain Cisco servers.

Organization

This guide is organized as follows:

Chapter	Title	Description
Chapter 1	Overview	Provides an overview of the Cisco UCS (Unified Computing System) C260 server.
Chapter 2	Installing the Server	Describes how to install the server in a rack, how to cable and power on the server, and how to initially set up the server in standalone mode.
Chapter 3	Maintaining the Server	Describes the server LEDs and buttons, identifies the replaceable components of the server, and describes how to replace them.
Appendix A	Server Specifications	Lists physical, environmental, and power specifications for the server.
Appendix B	Power Cord Specifications	Lists specifications for the supported international power cords.

Chapter	Title	Description
Appendix C	RAID Controller Considerations	Provides server RAID controller information.
Appendix D	Installation for Cisco UCS Integration	Provides installation and upgrade procedures for installing the server into Unified Computing System (UCS) integration.

Conventions

This document uses the following conventions for notes, cautions, and safety warnings. Notes and cautions contain important information that you should know.

Note Means *reader take note*. Notes contain helpful suggestions or references to material that are not covered in the publication.

Caution Means *reader be careful*. Cautions contain information about something you might do that could result in equipment damage or loss of data.

Safety warnings appear throughout this guide in procedures that, if performed incorrectly, can cause physical injuries. A warning symbol precedes each warning statement.

Warning **IMPORTANT SAFETY INSTRUCTIONS**

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device. Statement 1071

SAVE THESE INSTRUCTIONS

Waarschuwing **BELANGRIJKE VEILIGHEIDSINSTRUCTIES**

Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van de standaard praktijken om ongelukken te voorkomen. Gebruik het nummer van de verklaring onderaan de waarschuwing als u een vertaling van de waarschuwing die bij het apparaat wordt geleverd, wilt raadplegen.

BEWAAR DEZE INSTRUCTIES

Varoitus **TÄRKEITÄ TURVALLISUUSOHJEITA**

Tämä varoitusmerkki merkitsee vaaraa. Tilanne voi aiheuttaa ruumiillisia vammoja. Ennen kuin käsittelet laitteistoa, huomioi sähköpiirien käsittelemiseen liittyvät riskit ja tutustu onnettomuuksien yleisiin ehkäisytapoihin. Turvallisuusvaroitusten käännökset löytyvät laitteen mukana toimitettujen käännettyjen turvallisuusvaroitusten joukosta varoitusten lopussa näkyvien lausuntonumeroiden avulla.

SÄILYTÄ NÄMÄ OHJEET

Attention **IMPORTANTES INFORMATIONS DE SÉCURITÉ**

Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant entraîner des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers liés aux circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions des avertissements figurant dans les consignes de sécurité traduites qui accompagnent cet appareil, référez-vous au numéro de l'instruction situé à la fin de chaque avertissement.

CONSERVEZ CES INFORMATIONS

Warnung **WICHTIGE SICHERHEITSHINWEISE**

Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu Verletzungen führen kann. Machen Sie sich vor der Arbeit mit Geräten mit den Gefahren elektrischer Schaltungen und den üblichen Verfahren zur Vorbeugung vor Unfällen vertraut. Suchen Sie mit der am Ende jeder Warnung angegebenen Anweisungsnummer nach der jeweiligen Übersetzung in den übersetzten Sicherheitshinweisen, die zusammen mit diesem Gerät ausgeliefert wurden.

BEWAHREN SIE DIESE HINWEISE GUT AUF.

Avvertenza **IMPORTANTI ISTRUZIONI SULLA SICUREZZA**

Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle persone. Prima di intervenire su qualsiasi apparecchiatura, occorre essere al corrente dei pericoli relativi ai circuiti elettrici e conoscere le procedure standard per la prevenzione di incidenti. Utilizzare il numero di istruzione presente alla fine di ciascuna avvertenza per individuare le traduzioni delle avvertenze riportate in questo documento.

CONSERVARE QUESTE ISTRUZIONI

Advarsel **VIKTIGE SIKKERHETSINSTRUKSJONER**

Dette advarselssymbolet betyr fare. Du er i en situasjon som kan føre til skade på person. Før du begynner å arbeide med noe av utstyret, må du være oppmerksom på farene forbundet med elektriske kretser, og kjenne til standardprosedyrer for å forhindre ulykker. Bruk nummeret i slutten av hver advarsel for å finne oversettelsen i de oversatte sikkerhetsadvarslene som fulgte med denne enheten.

TA VARE PÅ DISSE INSTRUKSJONENE

Aviso **INSTRUÇÕES IMPORTANTES DE SEGURANÇA**

Este símbolo de aviso significa perigo. Você está em uma situação que poderá ser causadora de lesões corporais. Antes de iniciar a utilização de qualquer equipamento, tenha conhecimento dos perigos envolvidos no manuseio de circuitos elétricos e familiarize-se com as práticas habituais de prevenção de acidentes. Utilize o número da instrução fornecido ao final de cada aviso para localizar sua tradução nos avisos de segurança traduzidos que acompanham este dispositivo.

GUARDE ESTAS INSTRUÇÕES

¡Advertencia! **INSTRUCCIONES IMPORTANTES DE SEGURIDAD**

Este símbolo de aviso indica peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considere los riesgos de la corriente eléctrica y familiarícese con los procedimientos estándar de prevención de accidentes. Al final de cada advertencia encontrará el número que le ayudará a encontrar el texto traducido en el apartado de traducciones que acompaña a este dispositivo.

GUARDE ESTAS INSTRUCCIONES

Varning! **VIKTIGA SÄKERHETSANVISNINGAR**

Denna varningssignal signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanliga förfaranden för att förebygga olyckor. Använd det nummer som finns i slutet av varje varning för att hitta dess översättning i de översatta säkerhetsvarningar som medföljer denna anordning.

SPARA DESSA ANVISNINGAR

Opozorilo **FONTOS BIZTONSÁGI ELOÍRÁSOK**

Ez a figyelmezeto jel veszélyre utal. Sérülésveszélyt rejto helyzetben van. Mielott bármely berendezésen munkát végezte, legyen figyelemmel az elektromos áramkörök okozta kockázatokra, és ismerkedjen meg a szokásos balesetvédelmi eljárásokkal. A kiadványban szereplo figyelmeztetések fordítása a készülékhez mellékelt biztonsági figyelmeztetések között található; a fordítás az egyes figyelmeztetések végén látható szám alapján keresheto meg.

ORIZZE MEG EZEKET AZ UTASÍTÁSOKAT!

Предупреждение **ВАЖНЫЕ ИНСТРУКЦИИ ПО СОБЛЮДЕНИЮ ТЕХНИКИ БЕЗОПАСНОСТИ**

Этот символ предупреждения обозначает опасность. То есть имеет место ситуация, в которой следует опасаться телесных повреждений. Перед эксплуатацией оборудования выясните, каким опасностям может подвергаться пользователь при использовании электрических цепей, и ознакомьтесь с правилами техники безопасности для предотвращения возможных несчастных случаев. Воспользуйтесь номером заявления, приведенным в конце каждого предупреждения, чтобы найти его переведенный вариант в переводе предупреждений по безопасности, прилагаемом к данному устройству.

СОХРАНИТЕ ЭТИ ИНСТРУКЦИИ

警告　重要的安全性说明

此警告符号代表危险。您正处于可能受到严重伤害的工作环境中。在您使用设备开始工作之前，必须充分意识到触电的危险，并熟练掌握防止事故发生的标准工作程序。请根据每项警告结尾提供的声明号码来找到此设备的安全性警告说明的翻译文本。

请保存这些安全性说明

安全上の重要な注意事項

「危険」の意味です。人身事故を予防するための注意事項が記述されています。装置の取り扱い作業を行うときは、電気回路の危険性に注意し、一般的な事故防止策に留意してください。警告の各国語版は、各注意事項の番号を基に、装置に付属の「Translated Safety Warnings」を参照してください。

これらの注意事項を保管しておいてください。

주의　중요 안전 지침

이 경고 기호는 위험을 나타냅니다. 작업자가 신체 부상을 일으킬 수 있는 위험한 환경에 있습니다. 장비에 작업을 수행하기 전에 전기 회로와 관련된 위험을 숙지하고 표준 작업 관례를 숙지하여 사고를 방지하십시오. 각 경고의 마지막 부분에 있는 경고문 번호를 참조하여 이 장치와 함께 제공되는 번역된 안전 경고문에서 해당 번역문을 찾으십시오.

이 지시 사항을 보관하십시오.

Aviso　**INSTRUÇÕES IMPORTANTES DE SEGURANÇA**

Este símbolo de aviso significa perigo. Você se encontra em uma situação em que há risco de lesões corporais. Antes de trabalhar com qualquer equipamento, esteja ciente dos riscos que envolvem os circuitos elétricos e familiarize-se com as práticas padrão de prevenção de acidentes. Use o número da declaração fornecido ao final de cada aviso para localizar sua tradução nos avisos de segurança traduzidos que acompanham o dispositivo.

GUARDE ESTAS INSTRUÇÕES

Advarsel　**VIGTIGE SIKKERHEDSANVISNINGER**

Dette advarselssymbol betyder fare. Du befinder dig i en situation med risiko for legemesbeskadigelse. Før du begynder arbejde på udstyr, skal du være opmærksom på de involverede risici, der er ved elektriske kredsløb, og du skal sætte dig ind i standardprocedurer til undgåelse af ulykker. Brug erklæringsnummeret efter hver advarsel for at finde oversættelsen i de oversatte advarsler, der fulgte med denne enhed.

GEM DISSE ANVISNINGER

تحذير　**إرشادات الأمان الهامة**

يوضح رمز التحذير هذا وجود خطر. وهذا يعني أنك متواجد في مكان قد ينتج عنه التعرض لإصابات. قبل بدء العمل، احذر مخاطر التعرض للصدمات الكهربائية وكن على علم بالإجراءات القياسية للحيلولة دون وقوع أي حوادث. استخدم رقم البيان الموجود في أخر كل تحذير لتحديد مكان ترجمته داخل تحذيرات الأمان المترجمة التي تأتي مع الجهاز. قم بحفظ هذه الإرشادات

Upozorenje

VAŽNE SIGURNOSNE NAPOMENE

Ovaj simbol upozorenja predstavlja opasnost. Nalazite se u situaciji koja može prouzročiti tjelesne ozljede. Prije rada s bilo kojim uređajem, morate razumjeti opasnosti vezane uz električne sklopove, te biti upoznati sa standardnim načinima izbjegavanja nesreća. U prevedenim sigurnosnim upozorenjima, priloženima uz uređaj, možete prema broju koji se nalazi uz pojedino upozorenje pronaći i njegov prijevod.

SAČUVAJTE OVE UPUTE

Upozornění

DŮLEŽITÉ BEZPEČNOSTNÍ POKYNY

Tento upozorňující symbol označuje nebezpečí. Jste v situaci, která by mohla způsobit nebezpečí úrazu. Před prací na jakémkoliv vybavení si uvědomte nebezpečí související s elektrickými obvody a seznamte se se standardními opatřeními pro předcházení úrazům. Podle čísla na konci každého upozornění vyhledejte jeho překlad v přeložených bezpečnostních upozorněních, která jsou přiložena k zařízení.

USCHOVEJTE TYTO POKYNY

Προειδοποίηση

ΣΗΜΑΝΤΙΚΕΣ ΟΔΗΓΙΕΣ ΑΣΦΑΛΕΙΑΣ

Αυτό το προειδοποιητικό σύμβολο σημαίνει κίνδυνο. Βρίσκεστε σε κατάσταση που μπορεί να προκαλέσει τραυματισμό. Πριν εργαστείτε σε οποιοδήποτε εξοπλισμό, να έχετε υπόψη σας τους κινδύνους που σχετίζονται με τα ηλεκτρικά κυκλώματα και να έχετε εξοικειωθεί με τις συνήθεις πρακτικές για την αποφυγή ατυχημάτων. Χρησιμοποιήστε τον αριθμό δήλωσης που παρέχεται στο τέλος κάθε προειδοποίησης, για να εντοπίσετε τη μετάφρασή της στις μεταφρασμένες προειδοποιήσεις ασφαλείας που συνοδεύουν τη συσκευή.

ΦΥΛΑΞΤΕ ΑΥΤΕΣ ΤΙΣ ΟΔΗΓΙΕΣ

אזהרה

הוראות בטיחות חשובות

סימן אזהרה זה מסמל סכנה. אתה נמצא במצב העלול לגרום לפציעה. לפני שתעבוד עם ציוד כלשהו, עליך להיות מודע לסכנות הכרוכות במעגלים חשמליים ולהכיר את הנהלים המקובלים למניעת תאונות. השתמש במספר ההוראה המסופק בסופה של כל אזהרה כד לאתר את התרגום באזהרות הבטיחות המתורגמות שמצורפות להתקן.

שמור הוראות אלה

Opomena

ВАЖНИ БЕЗБЕДНОСНИ НАПАТСТВИЈА

Симболот за предупредување значи опасност. Се наоѓате во ситуација што може да предизвика телесни повреди. Пред да работите со опремата, бидете свесни за ризикот што постои кај електричните кола и треба да ги познавате стандардните постапки за спречување на несреќни случаи. Искористете го бројот на изјавата што се наоѓа на крајот на секое предупредување за да го најдете неговиот период во преведените безбедносни предупредувања што се испорачани со уредот.

ЧУВАЈТЕ ГИ ОВИЕ НАПАТСТВИЈА

Ostrzeżenie   **WAŻNE INSTRUKCJE DOTYCZĄCE BEZPIECZEŃSTWA**

Ten symbol ostrzeżenia oznacza niebezpieczeństwo. Zachodzi sytuacja, która może powodować obrażenia ciała. Przed przystąpieniem do prac przy urządzeniach należy zapoznać się z zagrożeniami związanymi z układami elektrycznymi oraz ze standardowymi środkami zapobiegania wypadkom. Na końcu każdego ostrzeżenia podano numer, na podstawie którego można odszukać tłumaczenie tego ostrzeżenia w dołączonym do urządzenia dokumencie z tłumaczeniami ostrzeżeń.

NINIEJSZE INSTRUKCJE NALEŻY ZACHOWAĆ

Upozornenie   **DÔLEŽITÉ BEZPEČNOSTNÉ POKYNY**

Tento varovný symbol označuje nebezpečenstvo. Nachádzate sa v situácii s nebezpečenstvom úrazu. Pred prácou na akomkoľvek vybavení si uvedomte nebezpečenstvo súvisiace s elektrickými obvodmi a oboznámte sa so štandardnými opatreniami na predchádzanie úrazom. Podľa čísla na konci každého upozornenia vyhľadajte jeho preklad v preložených bezpečnostných upozorneniach, ktoré sú priložené k zariadeniu.

USCHOVAJTE SI TENTO NÁVOD

Opozorilo   **POMEMBNI VARNOSTNI NAPOTKI**

Ta opozorilni simbol pomeni nevarnost. Nahajate se v situaciji, kjer lahko pride do telesnih poškodb. Preden pričnete z delom na napravi, se morate zavedati nevarnosti udara električnega toka, ter tudi poznati preventivne ukrepe za preprečevanje takšnih nevarnosti. Uporabite obrazložitveno številko na koncu posameznega opozorila, da najdete opis nevarnosti v priloženem varnostnem priročniku.

SHRANITE TE NAPOTKE!

警告   重要安全性指示
此警告符號代表危險，表示可能造成人身傷害。使用任何設備前，請留心電路相關危險，並熟悉避免意外的標準作法。您可以使用每項警告後的聲明編號，查詢本裝置隨附之安全性警告譯文中的翻譯。
請妥善保留此指示

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, using the Cisco Bug Search Tool (BST), submitting a service request, and gathering additional information, see *What's New in Cisco Product Documentation* at: http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html.

Subscribe to *What's New in Cisco Product Documentation*, which lists all new and revised Cisco technical documentation, as an RSS feed and deliver content directly to your desktop using a reader application. The RSS feeds are a free service.

Overview

This server is a high-performance, memory-intensive, 2RU rack-mount server designed to increase performance and capacity for demanding virtualization and large data-set workloads. This server uses Cisco Extended Memory Technology to increase the overall memory footprint as well as reduce the cost of smaller memory footprints through the use of lower-cost, lower-density memory. The system is built for standalone applications, virtualized workloads in enterprise data centers, service provider environments, and virtual desktop hosting.

The figures in this chapter show an overview of external server features. Internal server features are illustrated in Figure 3-5 on page 3-9. Figure 1-1 shows the front panel features of the server.

Figure 1-1   Front Panel Features
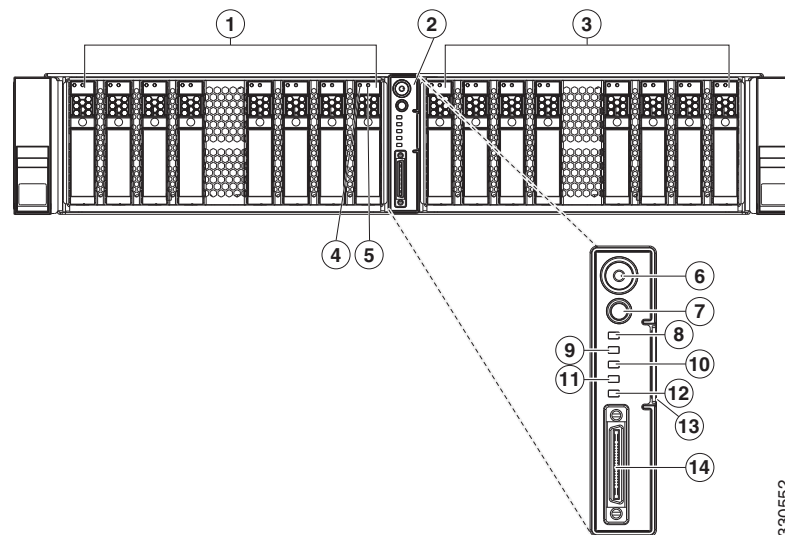
1	Modular drive bay 1	**8**	System status LED
2	Operations panel	**9**	Fan status LED
3	Modular drive bay 2	**10**	Temperature status LED
4	Hard drive fault LED	**11**	Power supply status LED
5	Hard drive activity LED	**12**	Network link activity LED
6	Power button/LED	**13**	Asset tag (serial number)
7	Identification button/LED	**14**	KVM console connector (used with KVM cable that provides two USB, one VGA, and one serial connector)

Figure 1-2 shows the rear panel features.

Figure 1-2   ***Rear Panel Features***
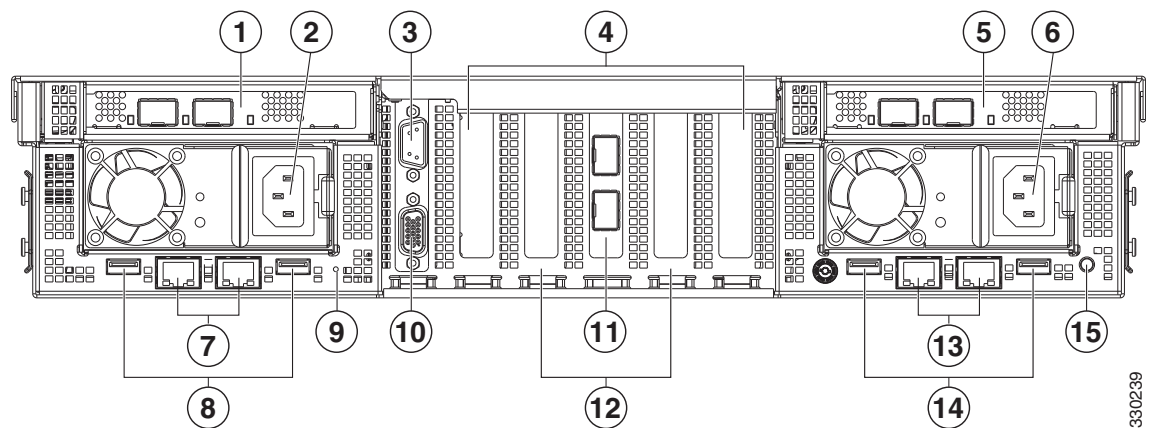
1	Horizontal PCIe slot on riser card (standard-profile, half-length, x16)	9	Reset button
2	Power supply 1	10	VGA video connector
3	RS-232 serial connector	11	10-Gb SFP+ LOM ports (2, supported with optional card in designated PCIe slot 4)
4	PCIe slots on motherboard (5) (4 low-profile, half-length, x8 slots and 1 low-profile, half-length, x4 slot)	12	RAID controller cards (up to 2, supported in designated PCIe slots 3 and 5)
5	Horizontal PCIe slot on riser card (standard-profile, half-length, x16)	13	1-Gb Base-T LOM ports (2, RJ-45)
6	Power supply 2	14	USB 2.0 ports (2)
7	10/100 dedicated management Ethernet ports (2, RJ-45)	15	Rear Identification button/LED
8	USB 2.0 ports (2)		–

Table 1-1 lists the features of the server.

Table 1-1   Cisco UCS C260 Server Features

Chassis	Two rack-unit (2RU) chassis.
Processors	Two Intel Xeon E7-2800 Series processors.
Memory	The server provides 16 memory riser sockets and two memory riser options: • When using the standard Intel chipset memory risers, the 16 risers can each hold 2 DIMMs[1]. This provides a possible total of up to 32 DIMMs and 512 GB of industry-standard DDR3[2] memory. • When using the optional memory risers that have a memory-expansion ASIC, the 16 risers can each hold 4 DIMMs. This provides a possible total of up to 64 DIMMs and 1024 GB of industry-standard DDR3 memory.
Multi-bit error protection	This server supports multi-bit error protection.
Storage	Drives are installed into configurable (one or two) drive bay modules that provide hot-pluggable front-panel access. Each drive bay module can hold up to eight 2.5in SAS[3] or SATA[4] hard drives or solid state drives, for a total of 16 drives.
Cisco FlexFlash drives	The server includes one internal Cisco FlexFlash drive (SD card). This drive is pre-loaded with four virtual drives. The four virtual drives contain, respectively, the Cisco Server Configuration Utility, the Cisco Host Upgrade Utility, the Cisco C-Series server drivers set, and a blank VD on which you can install an OS or a hypervisor. **Note** At this time, dual Cisco FlexFlash cards are not supported.

Disk Management	Factory-configured RAID[5] support options:
	
	• The LSI MegaRAID SAS 9261-8i controller provides RAID 0, 1, 5, 6, 10, 50, and 60 support for up to 8 SAS or SATA drives. Support for up to 16 maximum drives can be achieved in two ways:
	
	  – The server supports installation of two of these cards, which can be connected to two nonexpander-style transition cards.
	
	  – You can control up to 16 drives with one of these cards, if connected to an expander-style transition card. See Replacing a Modular Drive Bay Assembly, page 3-14 for more information about transition cards.
	
	There are also two mounting points inside the chassis for the optional LSI RAID battery backup units that can be used with the controller cards.

PCIe I/O	Seven PCIe[6] expansion slots (see Figure 3-26 on page 3-45 for details): • Two standard-profile, half-length, x16 horizontal slots on riser cards • Four low-profile, half-length, x8 slots on motherboard • One low-profile, half-length, x4 slot (x8-length connector) on motherboard The card length is the supported length because of internal clearance.
InfiniBand	The bus slots in this server support the InfiniBand architecture.

Table 1-1   ***Cisco UCS C260 Server Features (continued)***

Network and management I/O	The server provides these rear-panel connectors: • Two 10/100 dedicated management Ethernet ports • Two 1-Gb Base-T Ethernet ports • Two 10-Gb SFP+ Ethernet ports (on optional modular card) • One RS-232 serial connector • One 15-pin VGA[7] connector • Four USB[8] 2.0 connectors • One front-panel KVM connector that is used with the included KVM cable, which provides two USB, one VGA, and one serial connector.
WoL	The 1-Gb Base-T Ethernet LAN ports support the wake-on-LAN (WoL) standard.
Power	Two power supplies, 1200 W each. Redundant as 1+1.
ACPI	This server supports the advanced configuration and power interface (ACPI) 4.0 standard.
Cooling	Six fan modules, hot-swappable, redundant. In addition, there is 1 fan in each power supply.
Baseboard management	Pilot II BMC, running Cisco Integrated Management Controller (CIMC) firmware. Depending on your CIMC settings, the CIMC can be accessed through the 10/100 dedicated management ports, the 1-Gb LOM ports, the optional 10-Gb SFP+ ports, or a Cisco P81E virtual interface card.
Video	The server CIMC chip includes a Matrox G200 core. The first 8 MB of memory are allocated to the video core.

1. DIMM = dual inline memory module
2. DDR = double data rate (transfer mode)
3. SAS = serial attached SCSI
4. SATA = serial advanced technology attachment
5. RAID = redundant array of independent disks
6. PCIe = peripheral component interconnect express
7. VGA = video graphics array
8. USB = universal serial bus

C H A P T E R 2

Installing the Server

This chapter describes how to install the server, and it includes the following sections:

Note Before you install, operate, or service a server, review the *Regulatory Compliance and Safety Information for Cisco UCS C-Series Servers* for important safety information.

Warning **IMPORTANT SAFETY INSTRUCTIONS**

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device. Statement 1071

SAVE THESE INSTRUCTIONS

Unpacking and Inspecting the Server

⚠️

Caution   When handling internal server components, wear an ESD strap and handle modules by the carrier edges only.

🔍

Tip   Keep the shipping container in case the server requires shipping in the future.

✎

Note   The chassis is thoroughly inspected before shipment. If any damage occurred during transportation or any items are missing, contact your customer service representative immediately.

To inspect the shipment, follow these steps:

Step 1   Remove the server from its cardboard container and save all packaging material.

Step 2   Compare the shipment to the equipment list provided by your customer service representative and Figure 2-1. Verify that you have all items.

Step 3   Check for damage and report any discrepancies or damage to your customer service representative. Have the following information ready:

- Invoice number of shipper (see the packing slip)
- Model and serial number of the damaged unit
- Description of damage
- Effect of damage on the installation

Figure 2-1   Shipping Box Contents
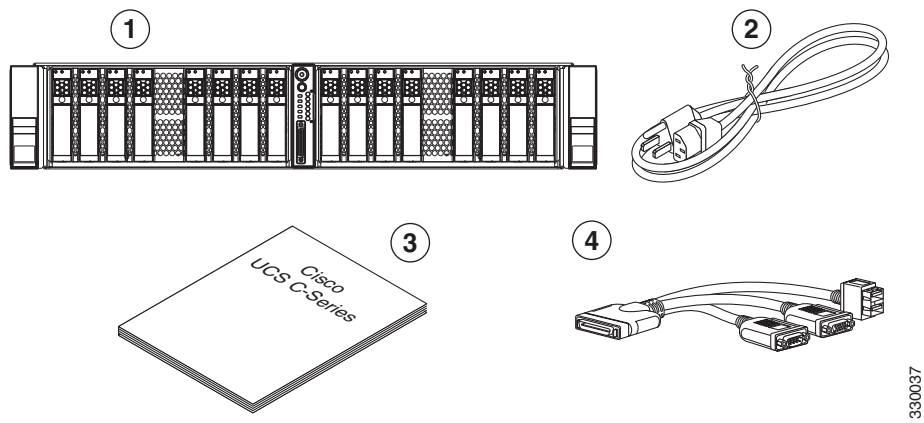
1	Server	3	Documentation
2	Power cord (optional, up to two)	4	KVM cable

Preparing for Server Installation

This section provides information about preparing for server installation, and it includes the following topics:

- Installation Guidelines, page 2-3
- Rack Requirements, page 2-4
- Equipment Requirements, page 2-4
- Slide Rail Adjustment Range, page 2-4

Installation Guidelines

Warning   **To prevent the system from overheating, do not operate it in an area that exceeds the maximum recommended ambient temperature of: 35° C (95° F).**
Statement 1047

Warning   **The plug-socket combination must be accessible at all times, because it serves as the main disconnecting device.**
Statement 1019

Warning   **This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that the protective device is rated not greater than: 250 V, 15 A.**
Statement 1005

Warning   **Installation of the equipment must comply with local and national electrical codes.**
Statement 1074

When you are installing a server, use the following guidelines:

- Plan your site configuration and prepare the site before installing the server. See the *Cisco UCS Site Preparation Guide* for the recommended site planning tasks.
- Ensure that there is adequate space around the server to allow for servicing the server and for adequate airflow. The airflow in this server is from front to back.
- Ensure that the air-conditioning meets the thermal requirements listed in the Server Specifications.
- Ensure that the cabinet or rack meets the requirements listed in the "Rack Requirements" section on page 2-4.
- Ensure that the site power meets the power requirements listed in the Server Specifications. If available, you can use an uninterruptible power supply (UPS) to protect against power failures.

Caution   Avoid UPS types that use ferroresonant technology. These UPS types can become unstable with systems such as the Cisco UCS, which can have substantial current draw fluctuations from fluctuating data traffic patterns.

Rack Requirements

This section provides the requirements for the standard open racks, assuming an external ambient air temperature range of 32°F to 95°F (0°C to 35°C).

The rack must be of the following type:

- A standard 19-in. (48.3-cm) wide, four-post EIA rack, with mounting posts that conform to English universal hole spacing, per section 1 of ANSI/EIA-310-D-1992.

- The rack post holes can be #12-24 square or round, or #10-32 round when you use the supplied slide rails.

- The minimum vertical rack space per server must be two RUs, equal to 3.5 in. (88.9 mm).

Equipment Requirements

The slide rails supplied by Cisco Systems for this server do not require tools for installation if you install them in a rack that has #12-24 square or round holes.

However, if you install the slide rails in a rack that has #10-32 round holes, a slotted screwdriver is required to remove the #12-24 mounting pegs from the front of the slide rails.

Slide Rail Adjustment Range

The slide rails for this server have an adjustment range of 26 to 36 inches (660 to 914 mm).

Installing the Server In a Rack

This section describes how to install the server in a rack.

Warning   **To prevent bodily injury when mounting or servicing this unit in a rack, you must take special precautions to ensure that the system remains stable. The following guidelines are provided to ensure your safety:**
This unit should be mounted at the bottom of the rack if it is the only unit in the rack.
When mounting this unit in a partially filled rack, load the rack from the bottom to the top with the heaviest component at the bottom of the rack.
If the rack is provided with stabilizing devices, install the stabilizers before mounting or servicing the unit in the rack.
Statement 1006

To install the slide rails and the server into a rack, follow these steps:

Step 1   Install the slide rails into the rack (see Figure 2-2):

a.   Align the slide-rail assembly inside the rack posts with the length-adjustment bracket (Figure 2-2, item 4) toward the rear of the rack.

b.   Compress the length-adjustment bracket until the mounting pegs (item 5) and locking clips (item 6) on the slide-rail assembly engage the desired rack holes on the front and rear rack posts.

–   The #12-24 mounting pegs fit square or round holes. They fit the shape of the hole when the pegs are compressed.

–   The #10-32 mounting pegs are enclosed in the center of the compressible #12-24 *rear* pegs. However, to use the #10-32 pegs, you must use a slotted screwdriver to remove the #12-24 *front* pegs.

Figure 2-2   Attaching a Slide-Rail Assembly
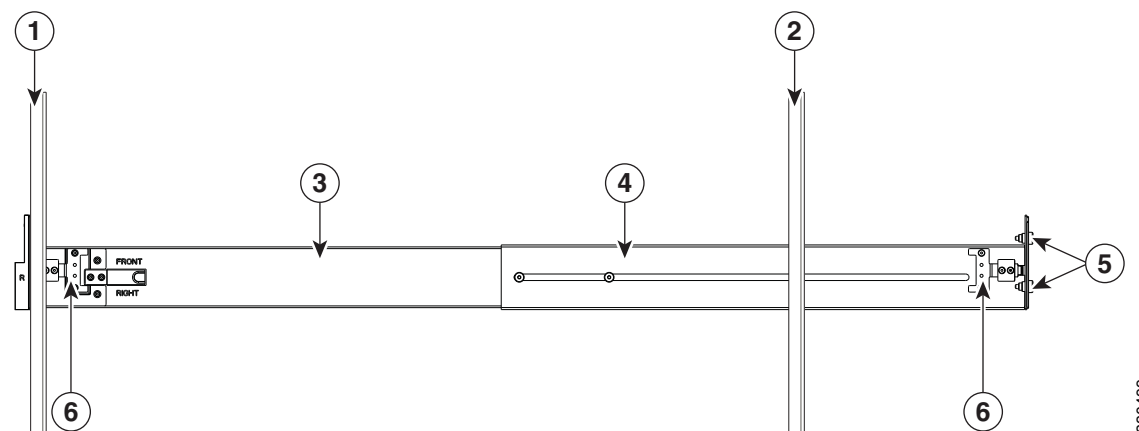
1	Front-right rack post	4	Length-adjustment bracket
2	Rear-right rack post	5	Mounting pegs (two on each end of assembly)
3	Slide-rail assembly	6	Locking clip (one on each end of assembly)

c.   Attach the second slide-rail assembly to the opposite side of the rack. Ensure that the two slide-rail assemblies are level and at the same height with each other.

d. Pull the inner slide rails on each assembly out toward the rack front until they hit the internal stops and lock in place.

Step 2 Insert the server into the slide rails (see Figure 2-3):

⚠️

Caution This server weighs approximately 83 pounds (38 kilograms) when fully loaded with components. We recommend that you use a minimum of two people when lifting the server. Attempting this procedure alone could result in personal injury or equipment damage.

a. Align the inner rails that are attached to the server sides with the front ends of the empty slide rails.

b. Push the server into the slide rails until it stops at the internal stops.

c. Push in the slide rail locking clip (item 2) on each inner rail, and then continue pushing the server into the rack until its front flanges latch onto the rack posts.

Figure 2-3   Inserting the Server Into the Slide Rails
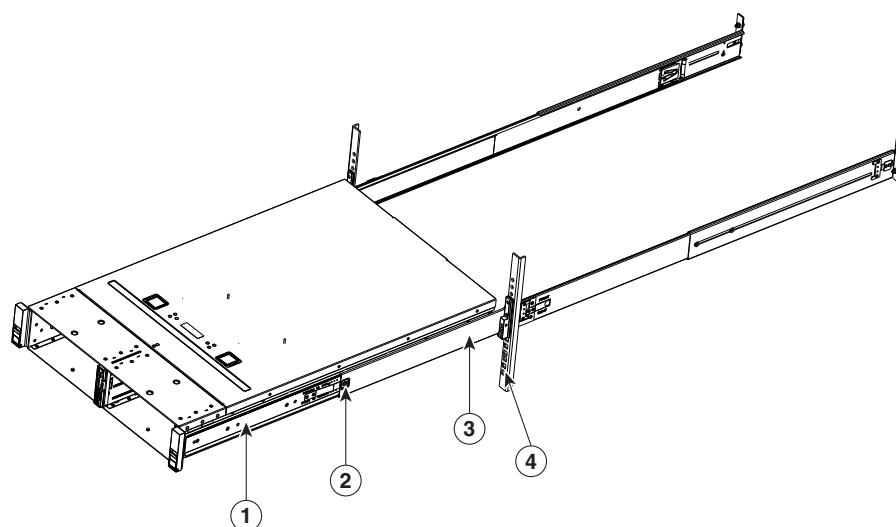
1	Inner rail attached to server	**3**	Slide rail assembly on rack post
2	Slide rail locking clip	**4**	Right-front rack post

Step 3 Attach the (optional) cable management arm (CMA) to the rear of the slide rails (see Figure 2-4):

✎

Note The CMA is reversible left-to-right.

a. With the server pushed fully into the rack, insert the CMA tab labelled OUTER RAIL (items 1 and 6) into the clip inside the rear of the outer slide rail. Insert the tab into the clip until it clicks and locks.

b. Pull outward on the spring-loaded peg that is on the CMA tab labelled INNER RAIL (items 2 and 5). You can turn this peg 90 degrees to lock it in the open position.

c. Push the CMA tab labelled INNER RAIL over the end of the inner rail that is attached to the server, and then release the spring-loaded peg. The peg must align with and enter the hole in the inner rail to lock the CMA in place.

Figure 2-4   Attaching the Cable Management Arm
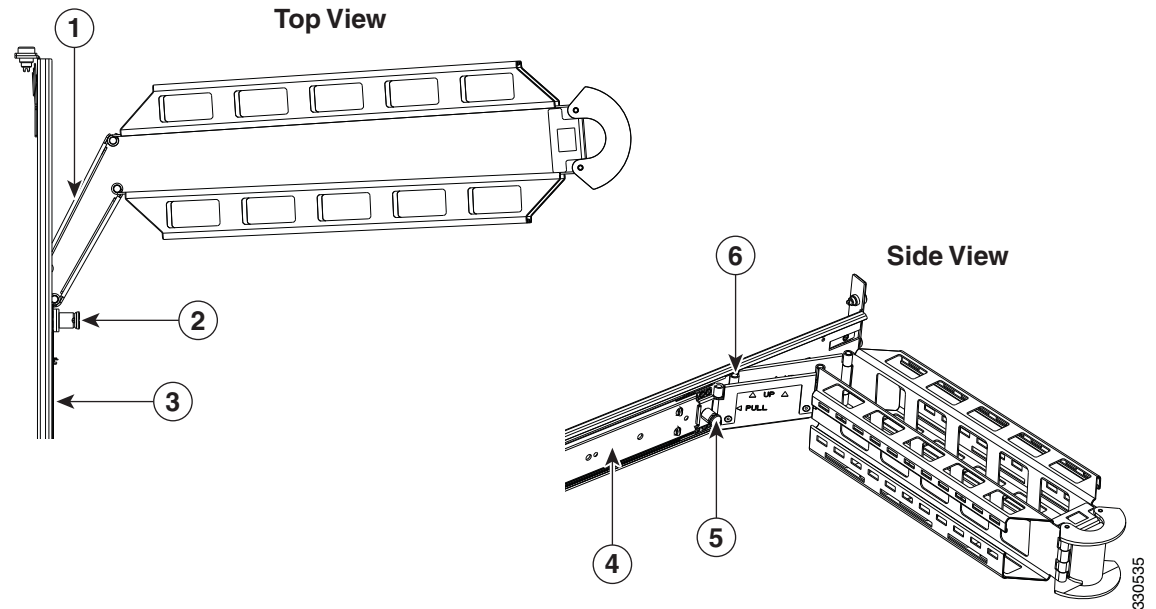
1	OUTER RAIL CMA tab attached to outer slide rail	4	Rear of left slide rail assembly
2	INNER RAIL CMA tab attached to inner slide rail on server	5	INNER RAIL CMA tab attached to inner slide rail on server
3	Rear of left slide rail assembly	6	OUTER RAIL CMA tab attached to outer slide rail

Note   The CMA is reversible left-to-right.

Initial Server Setup

This section includes the following topics:

- Connecting and Powering On the Server (Standalone Mode), page 2-8
- NIC Modes and NIC Redundancy Settings, page 2-11

Connecting and Powering On the Server (Standalone Mode)

> **Note** This section describes how to power on the server, assign an IP address, and connect to server management when using the server *in standalone mode*. To use the server in UCS integration, specific cabling and settings are required. See Installation for Cisco UCS Integration, page D-1.

> **Note** The server is shipped with a default NIC mode called Shared LOM EXT, default NIC redundancy is active-active, and DHCP is enabled. Shared LOM EXT mode enables the 1-Gb Ethernet ports and the ports on any installed Cisco virtual interface card (VIC) to access the Cisco Integrated Management Interface (CIMC). If you want to use the dedicated management ports to access the CIMC, you can connect to the server and change the NIC mode as described in Step 3 of the following procedure. In that step, you can also change the NIC redundancy and set static IP settings.

Use the following procedure to perform initial setup of the server:

Step 1 Attach a supplied power cord to each power supply in your server, and then attach the power cord to a grounded AC power outlet. See the Power Specifications, page A-2 for power specifications.

Wait for approximately two minutes to let the server boot in standby power during the first bootup.

You can verify power status by looking at the Power Status LED (see Figure 1-1 on page 1-1):

- Off—There is no AC power present in the server.
- Amber—The server is in standby power mode. Power is supplied only to the CIMC and some motherboard functions.
- Green—The server is in main power mode. Power is supplied to all server components.

> **Note** During bootup, the server beeps once for each USB device that is attached to the server. Even if there are no external USB devices attached, there is a short beep for each virtual USB device such as a virtual floppy drive, CD/DVD drive, keyboard, or mouse. A beep is also emitted if a USB device is hot-plugged or hot-unplugged during BIOS power-on self test (POST), or while you are accessing the BIOS Setup utility or the EFI shell.

Step 2 Connect a USB keyboard and VGA monitor by using the supplied KVM cable connected to the KVM connector on the front panel (see Figure 1-1 on page 1-1).

> **Note** Alternatively, you can use the VGA and USB ports on the rear panel. However, you cannot use the front panel VGA and the rear panel VGA at the same time. If you are connected to one VGA connector and you then connect a video device to the other connector, the first VGA connector is disabled.

Step 3   Set NIC mode, NIC redundancy, and choose whether to enable DHCP or set static network settings:

   a. Press the **Power** button to boot the server. Watch for the prompt to press F8.

   b. During bootup, press **F8** when prompted to open the BIOS CIMC Configuration Utility.

   c. Set the NIC mode to your choice for which ports to use to access the CIMC for server management (see Figure 1-2 on page 1-2 for identification of the ports):

   • Shared LOM EXT (default)—This is shared LOM extended mode. This is the factory-default setting, along with Active-active NIC redundancy and DHCP-enabled. With this mode, the shared LOM and Cisco Card interfaces are both enabled.

   In this mode, DHCP replies are returned to both the shared LOM ports and the Cisco card ports. If the system determines that the Cisco card connection is not getting its IP address from a Cisco UCS Manager system because the server is in standalone mode, further DHCP requests from the Cisco card are disabled. Use the Cisco Card NIC mode if you want to connect to the CIMC through a Cisco card in standalone mode.

   • Dedicated—The dedicated management port is used to access the CIMC. You must select a NIC redundancy and IP setting.

   • Shared LOM—The 1-Gb Ethernet ports are used to access the CIMC. You must select a NIC redundancy and IP setting.

   • Cisco Card—The ports on an installed Cisco UCS virtual interface card (VIC) are used to access the CIMC. You must select a NIC redundancy and IP setting.

   • Shared LOM 10G—The two 10-Gb Ethernet ports are used to access the CIMC. You must select a NIC redundancy and IP setting.

   Note   The Cisco Card NIC mode is currently supported only with a Cisco UCS VIC that is installed in PCIe slot 7. See also Special Considerations for Cisco UCS Virtual Interface Cards, page 3-50.

   d. Use this utility to change the NIC redundancy to your preference. This server has three possible NIC redundancy settings:

   – None—(Available only with the *Shipping* NIC mode) The Ethernet ports operate independently and do not fail over if there is a problem.

   – Active-standby—If an active Ethernet port fails, traffic fails over to a standby port.

   – Active-active—All Ethernet ports are utilized simultaneously. See NIC Modes and NIC Redundancy Settings, page 2-11 for more information.

   e. Choose whether to enable DHCP for dynamic network settings, or to enter static network settings.

   Note   Before you enable DHCP, your DHCP server must be preconfigured with the range of MAC addresses for this server. The MAC address is printed on a label on the rear of the server. This server has a range of six MAC addresses assigned to the CIMC. The MAC address printed on the label is the beginning of the range of six contiguous MAC addresses.

   f. Optional: Use this utility to make VLAN settings, and to set a default CIMC user password.

   Note   Changes to the settings take effect after approximately 45 seconds. Refresh with **F5** and wait until the new settings appear before you reboot the server in the next step.

   g. Press **F10** to save your settings and reboot the server.

✎

Note   If you chose to enable DHCP, the dynamically assigned IP and MAC addresses are displayed on the console screen during bootup.

Step 4   Connect to the CIMC for server management. Connect Ethernet cables from your LAN to the server by using the ports that you selected by your NIC Mode setting in Step 3. The Active-active and Active-passive NIC redundancy settings require you to connect to two ports.

Step 5   Use a browser and the IP address of the CIMC to connect to the CIMC Setup Utility. The IP address is based upon the settings that you made in Step 3 (either a static address or the address assigned by your DHCP server).

✎

Note   The default user name for the server is *admin*. The default password is *password*.

To manage the server, see the *Cisco UCS C-Series Rack-Mount Server Configuration Guide* or the *Cisco UCS C-Series Rack-Mount Server CLI Configuration Guide* for instructions on using those interfaces. The links to these documents are in the C-Series documentation roadmap:

http://www.cisco.com/go/unifiedcomputing/c-series-doc

NIC Modes and NIC Redundancy Settings

This server has the following NIC mode settings that you can choose from:

- Shared LOM EXT (default)—This is shared LOM extended mode. This is the factory-default setting, along with Active-active NIC redundancy and DHCP-enabled. With this mode, the shared LOM and Cisco Card interfaces are both enabled.

  In this mode, DHCP replies are returned to both the shared LOM ports and the Cisco card ports. If the system determines that the Cisco card connection is not getting its IP address from a Cisco UCS Manager system because the server is in standalone mode, further DHCP requests from the Cisco card are disabled. Use the Cisco Card NIC mode if you want to connect to the CIMC through a Cisco card in standalone mode.

- Dedicated—The dedicated management port is used to access the CIMC. You must select a NIC redundancy and IP setting.

- Shared LOM—The 1-Gb Ethernet ports are used to access the CIMC. You must select a NIC redundancy and IP setting.

- Cisco Card—The ports on an installed Cisco UCS virtual interface card (VIC) are used to access the CIMC. You must select a NIC redundancy and IP setting.

- Shared LOM 10G—The two 10-Gb Ethernet ports are used to access the CIMC. You must select a NIC redundancy and IP setting.

> **Note**   The Cisco Card NIC mode is currently supported only with a Cisco UCS VIC that is installed in PCIe slot 7. See also Special Considerations for Cisco UCS Virtual Interface Cards, page 3-50.

This server has the following NIC redundancy settings that you can choose from:

- None—The Ethernet ports operate independently and do not fail over if there is a problem.

- Active-standby—If an active Ethernet port fails, traffic fails over to a standby port.

- Active-active—All Ethernet ports are utilized simultaneously.

  The active/active setting uses Mode 5 or Balance-TLB (adaptive transmit load balancing). This is channel bonding that does not require any special switch support. The outgoing traffic is distributed according to the current load (computed relative to the speed) on each slave. Incoming traffic is received by the current slave. If the receiving slave fails, another slave takes over the MAC address of the failed receiving slave.

System BIOS and CIMC Firmware

This section includes information about the system BIOS and it includes the following sections:

- Updating the BIOS and CIMC Firmware, page 2-12
- Accessing the System BIOS, page 2-13

Updating the BIOS and CIMC Firmware

⚠️

Caution   When you upgrade the BIOS firmware, you must also upgrade the CIMC firmware to the same version or the server will not boot. Do not power off the server until the BIOS and CIMC firmware are matching or the server will not boot.

Cisco provides the Cisco Host Upgrade Utility to assist with simultaneously upgrading the BIOS, CIMC, and other firmware to compatible levels.

The server uses firmware obtained from and certified by Cisco. Cisco provides release notes with each firmware image. There are several methods for updating the firmware:

- **Recommended method for systems running firmware level 1.2 or later**: Use the Cisco Host Upgrade Utility to simultaneously upgrade the CIMC, BIOS, LOM, LSI storage controller, and Cisco UCS P81E VIC firmware to compatible levels.

  See the *Cisco Host Upgrade Utility Quick Reference Guide* for your firmware level at the documentation roadmap link below.

✎

Note   Your system firmware must be at minimum level 1.2 to use the Cisco Host Upgrade Utility. If your firmware is prior to level 1.2, you must use the methods below to update the BIOS and CIMC firmware individually.

- You can upgrade the BIOS using the EFI interface, or upgrade from a Windows or Linux platform.

  See the *Cisco UCS C-Series Rack-Mount Server BIOS Upgrade Guide*.

- You can upgrade the CIMC firmware by using the CIMC GUI interface.

  See the *Cisco UCS C-Series Rack-Mount Server Configuration Guide*.

- You can upgrade the CIMC firmware by using the CIMC CLI interface.

  See the *Cisco UCS C-Series Rack-Mount Server CLI Configuration Guide*.

For links to the documents listed above, see the documentation roadmap at the following URL:

http://www.cisco.com/go/unifiedcomputing/c-series-doc

Accessing the System BIOS

To change the BIOS settings for your server, follow these steps. Detailed instructions are also printed on the BIOS screens.

Step 1   Enter the BIOS setup utility by pressing the **F2** key when prompted during bootup.

> ✎
>
> **Note**   The version and build of the current BIOS are displayed on the Main page of the utility.

Step 2   Use the arrow keys to select the BIOS menu page.

Step 3   Highlight the field to be modified by using the arrow keys.

Step 4   Press **Enter** to select the field that you want to change, and then modify the value in the field.

Step 5   Press the right arrow key until the Exit menu screen is displayed.

Step 6   Follow the instructions on the Exit menu screen to save your changes and exit the setup utility (or Press **F10**). You can exit without saving changes by pressing **Esc**.

Service DIP Switch

This server includes a DIP switch on the I/O riser module that you can use to recover from a corrupted BIOS.

DIP Switch Location on the I/O Riser

See Figure 2-5. The block of DIP switches is located on the I/O riser. The default position for all switches is open (down).

The I/O riser is the removable card that includes the rear-panel serial and VGA connectors. See Figure 3-5 for the location of the I/O riser in the server.

Figure 2-5   I/O Riser, Showing DIP Switches
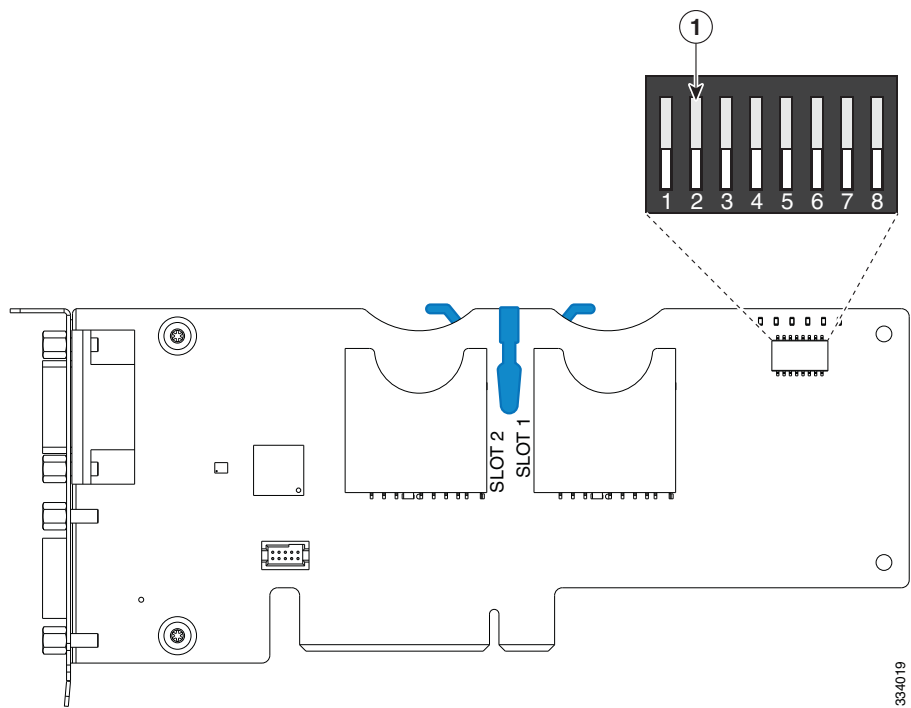
1	DIP switch 2 for BIOS recovery (shown in default open position)	–	

Using the BIOS Recovery DIP Switch

See Figure 2-5 for the location of the DIP switch.

Step 1   Download the BIOS update package and extract it to a temporary location.

Step 2   Copy the BIOS recovery files to the root directory of a USB thumb drive using either one of the following methods:

- Copy the contents of the extracted UEFI folder to the root directory of a USB thumb drive. The UEFI folder contains the flash utility, BIOS recovery image, and other necessary files that are required in this procedure.

- The recovery folder contains a recovery ISO image. Extract and copy the contents of the recovery ISO image to the root directory of a USB thumb drive. The recovery ISO image contains the flash utility, BIOS recovery image, and other necessary files that are required in this procedure.

Step 3   Power off the server as described in Shutting Down and Powering Off the Server, page 3-7.

Step 4   Disconnect all power cords from the power supplies.

Step 5   Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.

⚠️

Caution   If you cannot safely view and access the component, remove the server from the rack.

Step 6   Remove the top cover as described in Removing and Replacing the Server Top Cover, page 3-8.

Step 7   Locate BIOS recovery DIP switch 2. See Figure 2-5.

Step 8   Use a small pointed object such as a screwdriver to move DIP switch 2 to the closed (upper) position.

Step 9   Reconnect AC power cords to the server. The server powers up to standby power mode.

Step 10   Insert the USB thumb drive that you prepared in Step 2 into a USB port on the server.

Step 11   Return the server to main power mode by pressing the **Power** button on the front panel.

The server boots with the updated BIOS boot block. When the BIOS detects a valid `recovery.cap` file on the USB thumb drive, it proceeds with the BIOS update.

Step 12   Wait for server to complete the BIOS update, then remove the USB thumb drive from the server.

✎

Note   During the BIOS update, the CIMC will shut down the server and the screen will be blank for about 10 minutes. Do not unplug the power cords during this update. The CIMC will power on the server after the update is complete.

Step 13   After the server has fully booted, power off the server again and disconnect all power cords.

Step 14   Move DIP switch 2 back to the default open (lower) position.

✎

Note   If you do not move the switch back to the default position, the CIMC will attempt to recover the BIOS every time you boot the server.

Step 15   Replace the top cover, replace the server in the rack, replace power cords and any other cables, then power on the server by pressing the **Power** button.

Maintaining the Server

This chapter describes how to diagnose server system problems using LEDs. It also provides information about how to install or replace hardware components, and it includes the following sections:

Server Monitoring and Management Tools

Cisco Integrated Management Interface (CIMC)

You can monitor the server inventory, health, and system event logs by using the built-in Cisco Integrated Management Controller (CIMC) GUI or CLI interfaces. See the user documentation for your firmware release at the following URL:

http://www.cisco.com/en/US/products/ps10739/products_installation_and_configuration_guides_list.html

Server Configuration Utility

Cisco has also developed the Cisco Server Configuration Utility for C-Series servers, which can aid and simplify the following tasks:

- Monitoring server inventory and health
- Diagnosing common server problems with diagnostic tools and logs
- Setting the BIOS booting order
- Configuring some RAID configurations
- Installing operating systems

This utility is pre-installed on an internal Cisco FlexFlash card inside the server (see Overview of the Pre-Installed Cisco FlexFlash Card, page 3-39). You can also download the ISO from Cisco.com. See the user documentation for this utility at the following URL:

http://www.cisco.com/en/US/docs/unified_computing/ucs/sw/ucsscu/user/guide/20/SCUUG20.html

Status LEDs and Buttons

This section describes the location and meaning of LEDs and buttons and includes the following topics

- Front Panel LEDs, page 3-2
- Rear Panel LEDs and Buttons, page 3-4
- Internal Diagnostic LEDs, page 3-6

Front Panel LEDs

Figure 3-1 shows the front panel LEDs. Table 3-1 on page 3-3 defines the LED states.

Figure 3-1   Front Panel LEDs
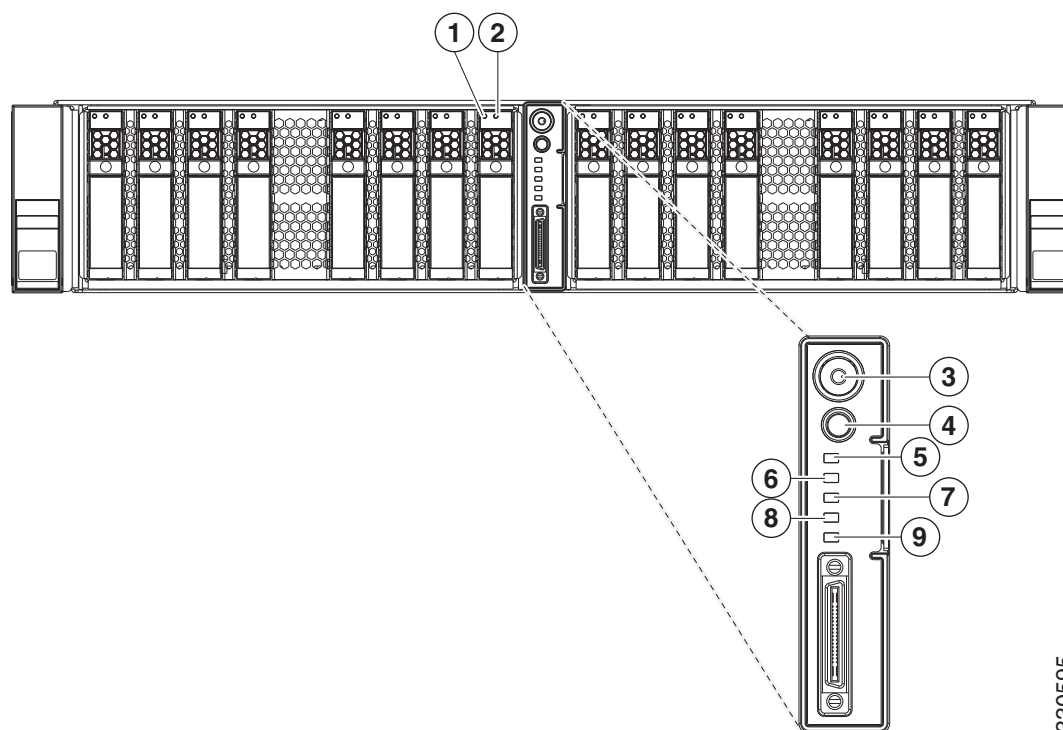
1	Hard drive fault LED	**6**	Fan status LED
2	Hard drive activity LED	**7**	Temperature status LED
3	Power button/Power status LED	**8**	Power supply status LED
4	Identification button/LED	**9**	Network link activity LED
5	System status LED		–

Table 3-1   Front Panel LEDs, Definitions of States

LED Name	State
Hard drive activity	• Off—There is no hard drive in the hard drive sled (no access, no fault). • Green—The hard drive is ready. • Green, blinking—The hard drive is reading or writing data.
Hard drive fault	• Off—The hard drive is operating properly. • Amber—This hard drive has failed. • Amber, blinking—The device is rebuilding.
Power button/Power status LED	• Off—There is no AC power to the server. • Amber—The server is in standby power mode. Power is supplied only to the CIMC and some motherboard functions. • Green—The server is in main power mode. Power is supplied to all server components.
Identification	• Off—The Identification LED is not in use. • Blue—The Identification LED is activated.

System status	• Green—The server is running in normal operating condition.
	• Green, blinking—The server is performing system initialization and memory check.
	• Amber, steady—The server is in a degraded operational state. For example:
	  – Power supply redundancy is lost.
	  – CPUs are mismatched.
	  – At least one CPU is faulty.
	  – At least one DIMM is faulty.
	  – At least one drive in a RAID configuration failed.
	• Amber, blinking—The server is in a critical fault state. For example:
	  – Boot failed.
	  – Fatal CPU and/or bus error is detected.
	  – Server is in over-temperature condition.

Fan status	• Green—All fan modules are operating properly. • Amber, steady—One fan module has failed. • Amber, blinking—Critical fault, two or more fan modules have failed.
Temperature status	• Green—The server is operating at normal temperature. • Amber, steady—One or more temperature sensors have exceeded a warning threshold. • Amber, blinking—One or more temperature sensors have exceeded a critical threshold.

Table 3-1   Front Panel LEDs, Definitions of States (continued)

LED Name	State
Power supply status	• Green—All power supplies are operating normally. • Amber, steady—One or more power supplies are in a degraded operational state. • Amber, blinking—One or more power supplies are in a critical fault state.
Network link activity	• Off—The Ethernet link is idle. • Green—One or more Ethernet LOM ports are link-active. • Green, blinking—One or more Ethernet LOM ports are link-active, with activity.

Rear Panel LEDs and Buttons

Figure 3-2 shows the rear panel LEDs and buttons.

Figure 3-2   Rear Panel LEDs and Buttons
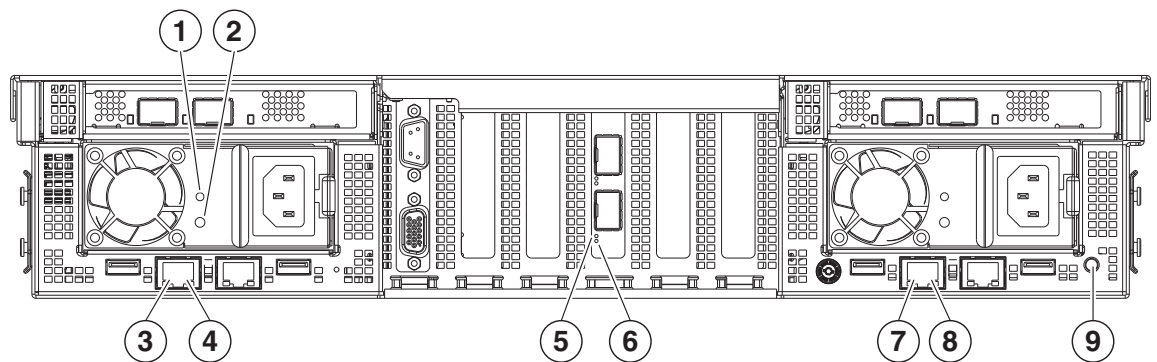
1	Power supply status	6	10-Gb Ethernet link speed (present only if 10-Gb module is installed)
2	Power supply fault	7	1-Gb Ethernet link speed
3	10/100 Ethernet link speed	8	1-Gb Ethernet link status
4	10/100 Ethernet link status	9	Rear Identification button/LED
5	10-Gb Ethernet link status (present only if 10-Gb module is installed)		–

Table 3-2   ***Rear Panel LEDs, Definitions of States***

LED Name	State
Power supply status LED	• Green, steady—The power supply is operating normally and supplying AC power to the server. • Green, blinking—The power supply is off and in cold-redundancy mode.
Power supply fault LED	• Off—The power supply is operating normally. • Amber, blinking—An event warning threshold has been reached, but the power supply continues to operate. • Amber, steady—A critical fault threshold has been reached, causing the power supply to shut down.
10/100 Ethernet link speed	• Off—link speed is 10 Mbps. • Green—link speed is 100 Mbps.
10/100 Ethernet link status	• Off—No link is present. • Green—Link is active. • Green, blinking—Traffic is present on the active link.
10-Gb Ethernet link speed	• Off—link speed is 10 Mbps. • Green—link speed is 10 Gbps.
10-Gb Ethernet link status	• Off—No link is present. • Green—Link is active. • Green, blinking—Traffic is present on the active link.
1-Gb Ethernet link speed	• Off—link speed is 10 Mbps. • Amber—link speed is 100 Mbps. • Green—link speed is 1 Gbps.
1-Gb Ethernet link status	• Off—No link is present. • Green—Link is active. • Green, blinking—Traffic is present on the active link.
Identification	• Off—The Identification LED is not in use. • Blue—The Identification LED is activated.

Internal Diagnostic LEDs

The server is equipped with a SuperCap voltage source that can activate internal component fault LEDs up to one half-hour after AC power is removed.

To use these LEDs to identify a failed component, press the front or rear Identification button (see Figure 3-1 or Figure 3-2) with AC power removed. An LED lights amber to indicate a failed component.

The server has internal fault LEDs for fan modules, CPU sockets, DIMMs, memory risers, the motherboard RTC battery, PCIe sockets, and Cisco FlexFlash cards.

See Figure 3-3 for the locations of these internal LEDs.

Figure 3-3   Internal Diagnostic LED Locations
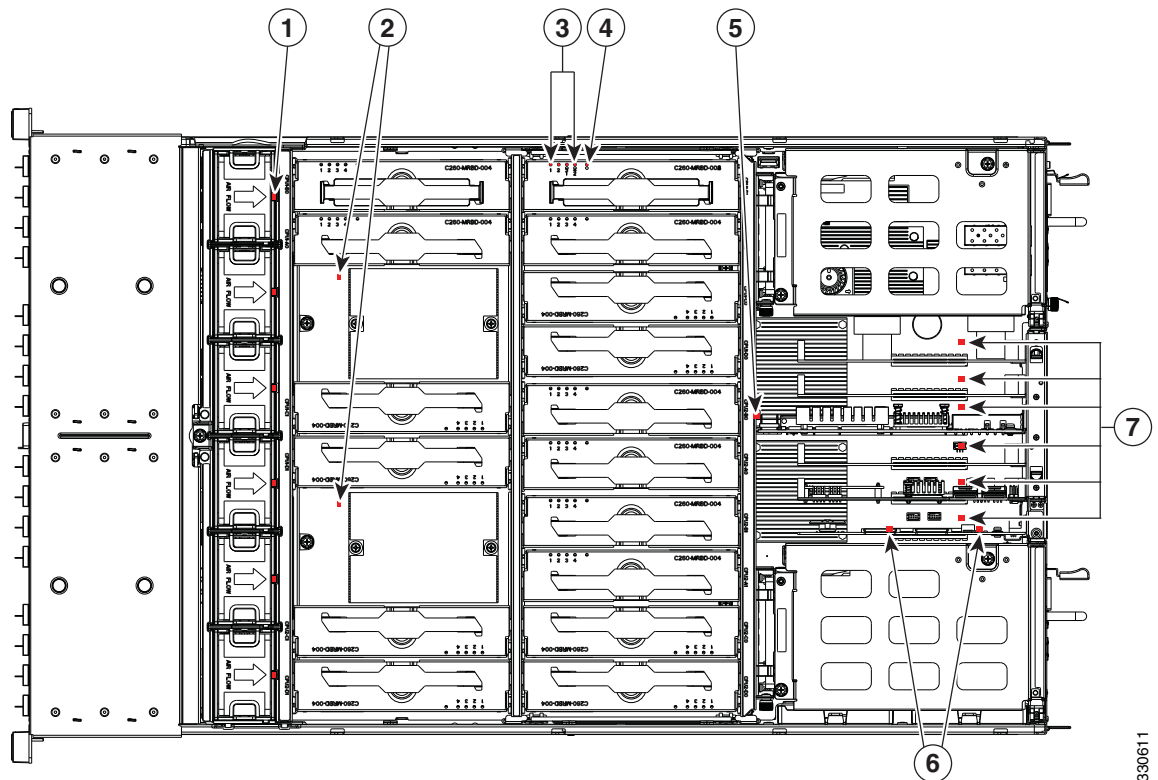
1	Fan module fault LED (one on each fan)	5	RTC battery fault LED (on motherboard)
2	CPU fault LEDs (on motherboard)	6	Cisco FlexFlash card fault LEDs (one on each card socket on the I/O riser)
3	DIMM fault LEDs (on each memory riser)	7	PCIe card fault LED (on motherboard adjacent to each PCIe slot)
4	Memory riser fault LED (on each memory riser)	–	

Table 3-3   Internal Diagnostic LEDs, Definition of States

LED Name	State
Internal diagnostic LEDs (all)	• Off—Component is functioning normally. • Amber—Component has failed.

Preparing for Server Component Installation

This section describes how to prepare for component installation, and it includes the following topics:

Required Equipment

The following equipment is used to perform the procedures in this chapter:

- Number 1 Phillips-head screwdriver
- Number 2 Phillips-head screwdriver
- Needle-nose pliers
- Electrostatic discharge (ESD) strap or other grounding equipment such as a grounded mat

Shutting Down and Powering Off the Server

The server can run in two power modes:

- Main power mode—Power is supplied to all server components and any operating system on your hard drives can run.
- Standby power mode—Power is supplied only to the service processor and the cooling fans and it is safe to power off the server from this mode.

You can invoke a graceful shutdown or an hard shutdown by using either of the following methods:

- Use the CIMC management interface.
- Use the **Power** button on the server front panel. To use the **Power** button, follow these steps:

Step 1   Check the color of the Power Status LED (see the "Front Panel LEDs" section on page 3-2).

- Green—the server is in main power mode and must be shut down before it can be safely powered off. Go to Step 2.
- Amber—the server is already in standby mode and can be safely powered off. Go to Step 3.

Step 2   Invoke either a graceful shutdown or a hard shutdown:

⚠

Caution   To avoid data loss or damage to your operating system, you should always invoke a graceful shutdown of the operating system.

- Graceful shutdown—Press and release the **Power** button. The operating system performs a graceful shutdown and the server goes to standby mode, which is indicated by an amber Power Status LED.
- Emergency shutdown—Press and hold the **Power** button for 4 seconds to force the main power off and immediately enter standby mode.

Step 3 Disconnect the power cords from the power supplies in your server to completely power off the server.

Removing and Replacing the Server Top Cover

To remove or replace the top cover of the server, follow these steps:

Tip You do not have to remove the cover to replace hard drives or power supplies.

Step 1 Remove the top cover:

   a. Simultaneously press the two release buttons. See Figure 3-4.

   b. Push the top cover toward the server rear about one-half inch (1.27 cm), until it stops.

   c. Lift the top cover straight up from the server and set it aside.

Step 2 Replace the top cover:

   a. Place the cover on top of the server about one-half inch (1.27 cm) behind the lip of the chassis front cover panel. The cover should sit flat when the edge flanges are sitting in the grooves in the chassis.

   b. Slide the top cover toward the front cover panel until it stops and the release buttons lock.

Figure 3-4   Removing the Top Cover
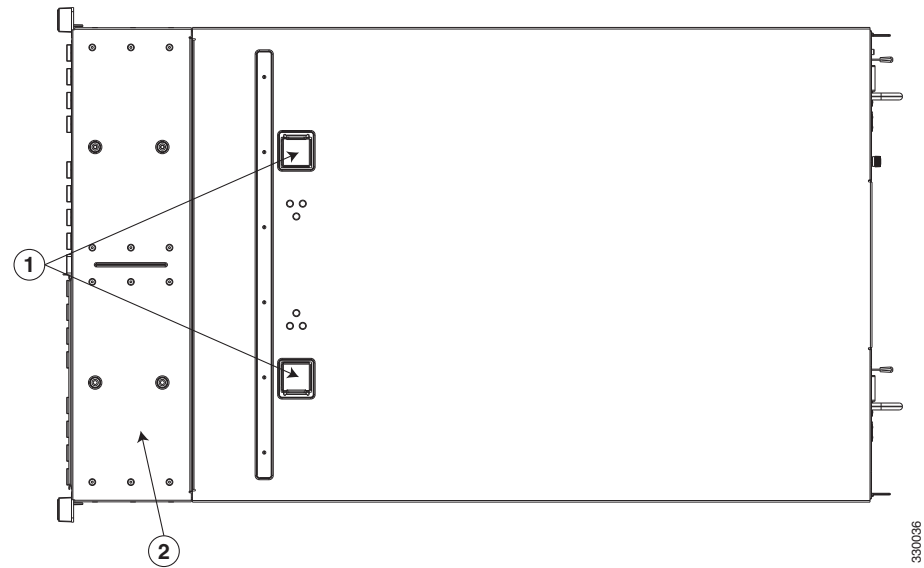
1	Release buttons	**2**	Front cover panel

Replaceable Component Locations

This section shows the locations of the components that are discussed in this chapter. The view in Figure 3-5 is from the top down with the top cover removed.

Figure 3-5   *Replaceable Component Locations*
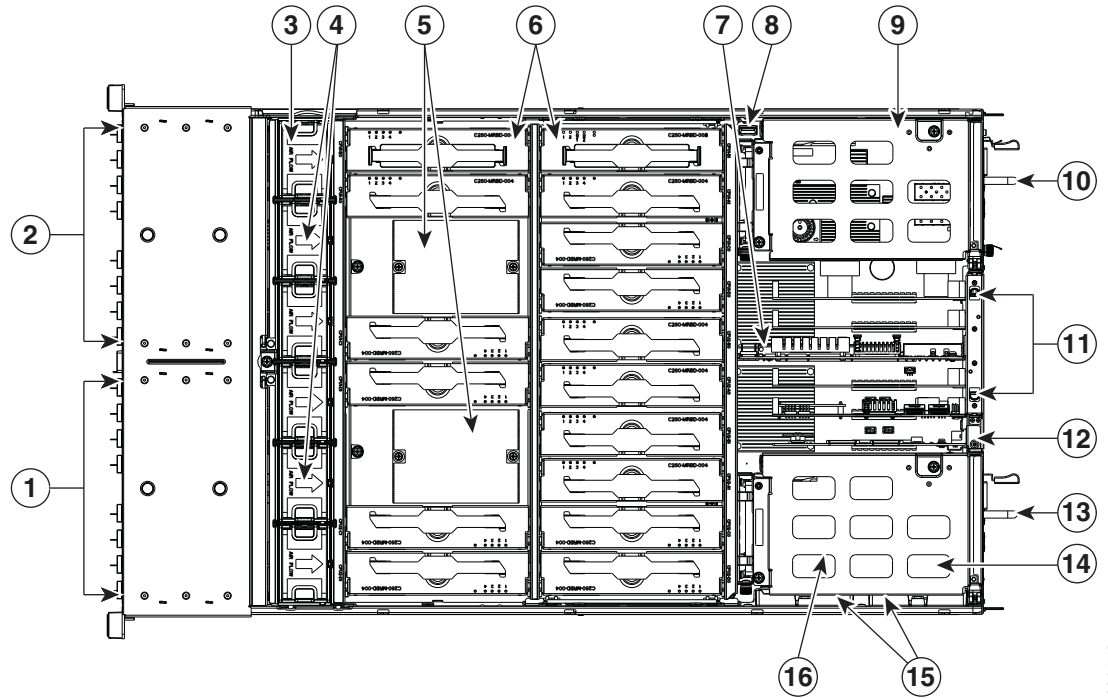
1	Drive bay module 2 (up to eight 2.5-inch drives, hot-pluggable access through the front panel)	**9**	PCIe riser in PCIe slot 7
2	Drive bay module 1 (up to eight 2.5-inch drives, hot-pluggable access through the front panel)	**10**	Power supply 2 (hot-pluggable access through rear panel)
3	Fan tray, holding six fan modules	**11**	PCIe slots 2–6 on motherboard (5) See also Figure 3-26 on page 3-45 for details.
4	Drive backplane transition cards (up to 2 on chassis floor, not visible under fan tray in this view)	**12**	I/O riser (includes sockets for Cisco FlexFlash cards)
5	CPUs and heatsinks (up to 2)	**13**	Power supply 1 (hot-pluggable access through rear panel)
6	Memory risers (16) Two-DIMM risers total capacity is 32 DIMMs. Four-DIMM risers total capacity is 64 DIMMs.	**14**	PCIe riser in PCIe slot 1
7	RTC battery	**15**	Brackets for optional LSI RAID controller battery backup units (2)
8	Vertical USB slot	**16**	TPM socket (on motherboard, not visible under power supply in this view)

Color-Coded Touch Points

This server has color-coded touch points that indicate thumbscrews and latches on replaceable and hot-swappable components.

- Hot-swappable components have green plastic touch points. This includes the internal cooling fans and the power supplies. (An exception is the drive trays on the front panel, which are hot-swappable but not green).

- Some replaceable but non-hot-swappable components have light-blue plastic touch-points. This includes memory risers, PCIe risers, PCIe slots, and fan tray.

Installing or Replacing Server Components

Warning   **Blank faceplates and cover panels serve three important functions: they prevent exposure to hazardous voltages and currents inside the chassis; they contain electromagnetic interference (EMI) that might disrupt other equipment; and they direct the flow of cooling air through the chassis. Do not operate the system unless all cards, faceplates, front covers, and rear covers are in place.**
Statement 1029

Warning   **Class 1 laser product.**
Statement 1008

Caution   When handling server components, wear an ESD strap to avoid damage.

Tip   You can press the ID button on the front panel or rear panel to turn on a flashing ID LED on the front and rear panels of the server. This allows you to locate the specific server that you are servicing when you go to the opposite side of the rack. See the "Status LEDs and Buttons" section on page 3-2 for locations of the LEDs.

This section describes how to install and replace server components, and it includes the following topics:

- Replacing Hard Drives or Solid State Drives, page 3-12
- Replacing a Modular Drive Bay Assembly, page 3-14
- Replacing Fan Modules, page 3-17
- Replacing a Fan Tray, page 3-19
- Replacing Memory Risers, page 3-21
- Replacing DIMMs, page 3-25
- Replacing CPUs and Heatsinks, page 3-29
- Replacing the Motherboard RTC Battery, page 3-33
- Replacing a PCIe Riser Assembly, page 3-35
- Replacing an I/O Riser, page 3-37
- Replacing a Cisco Flexible Flash Card, page 3-39
- Replacing a 10-Gb LOM Module, page 3-43
- Replacing a PCIe Card, page 3-45
- Replacing the RAID Controller Battery Backup Unit, page 3-54
- Installing a Trusted Platform Module, page 3-56
- Enabling the Intel Trusted Execution Technology (TXT) Feature For the TPM, page 3-57
- Replacing Power Supplies, page 3-59
- Enabling or Disabling the Internal USB Port, page 3-60

Replacing Hard Drives or Solid State Drives

This section includes the following information:

- Drive Population Guidelines, page 3-12
- Drive Replacement Procedure, page 3-12

Drive Population Guidelines

The server can operate with one or two drive bay modules. Each of the drive bay modules can hold up to eight 2.5-inch drives, for a total of 16.

The internal firmware designation of drive numbering depends on how many drives are installed, as shown in Figure 3-6.

Figure 3-6   Drive Numbering (Facing Front of Server)

Drive Bay Module 1 (Left)								Drive Bay Module 2 (Right)							
1	2	3	4	.	.	.	N	N+1	N+2	N+3	N+4	.	.	.	M

Observe these drive population guidelines for optimum performance:

- When populating drives in a drive bay module, add drives in empty slots from left to right.
- If your server has two drive bay modules, add drives evenly across the two modules.
- Keep an empty drive blanking tray in any unused slots to ensure proper air flow.
- You can mix hard drives and SSDs in the same server. However, You cannot configure a logical volume (virtual drive) that contains a mix of hard drives and SSDs. That is, when you create a logical volume, it must contain all hard drives or all SSDs.

Drive Replacement Procedure

To replace or install a hot-pluggable hard drive, follow these steps:

Tip   You do not have to shut down or power off the server to replace hard drives or solid state drives (SSDs) because they are hot pluggable.

Step 1   Remove the drive that you are replacing or remove a blank panel from an empty bay:

a.   Press the release button on the face of the drive tray. See Figure 3-7.

b.   Grasp and open the ejector lever and then pull the drive tray out of the slot.

c.   If you are replacing an existing drive, remove the four drive tray screws that secure the drive to the tray and then lift the drive out of the tray.

Step 2   Install a new drive:

a.   Place a new drive in the empty drive tray and replace the four drive tray screws.

b.   With the ejector lever on the drive tray open, insert the drive tray into the empty drive bay.

c.   Push the tray into the slot until it touches the backplane, then close the ejector lever to lock the drive in place.

Figure 3-7   *Removing and Replacing Hard Drives*
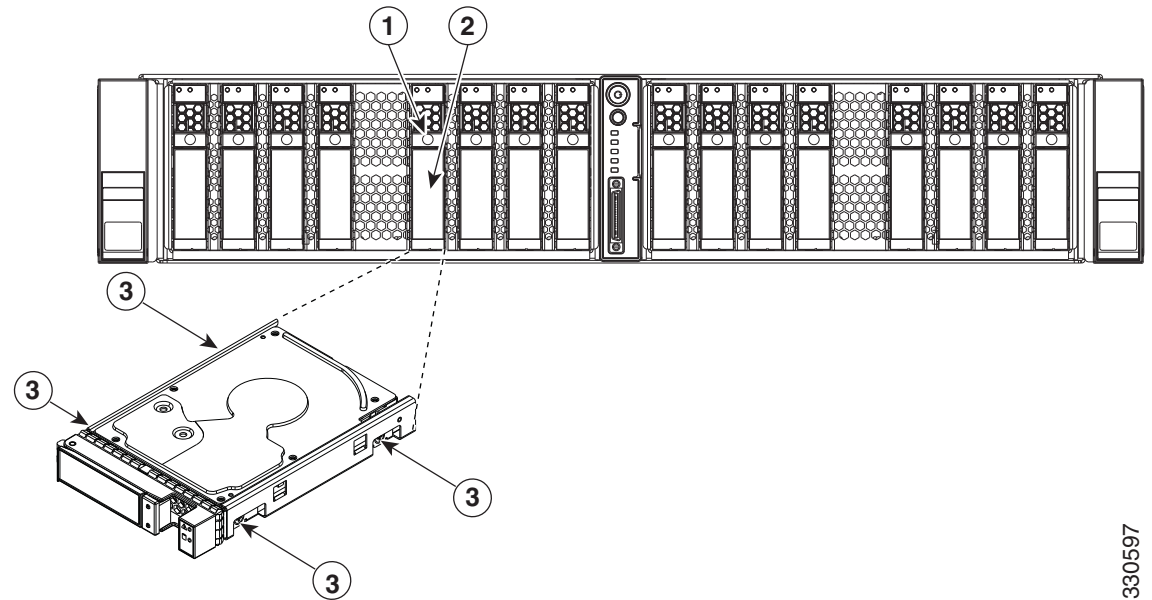
1	Release button	3	Drive tray securing screws (4)
2	Ejector lever		–

Replacing a Modular Drive Bay Assembly

This server allows modular configuration of the drive bays, so that you can use one or two drive bays depending on your needs.

Each drive bay assembly includes the chassis-steel drive bay, the attached drive backplane, and a transition card (expander or nonexpander version) that provides connection to your RAID controllers and the motherboard.

- Each of the two modular chassis drive bays can hold up to eight 2.5-inch drives.
- Each drive backplane connects to one transition card. The transition card connects the drive backplane to the motherboard and connects to cables from your RAID controller.
- The transition card is available in two versions:
  - Nonexpander—Two internal connections to the RAID controller card are required to control eight drives. This version includes two connectors for the cables from your RAID controller. One of the connectors allows control of drives 1 through 4 on the backplane. The other connector allows control of drives 5 through 8 on the backplane.
  - Expander—One internal connection to the RAID controller card is required to control eight drives. This one connectors allows control of drives 1 through 8 on the backplane.
- To use more than eight 2.5-inch drives in the server (up to 16), two drive bay modules are required, each with its own backplane and transition card.

Figure 3-8   Drive Bay Assembly and Transition Card (Two Versions)
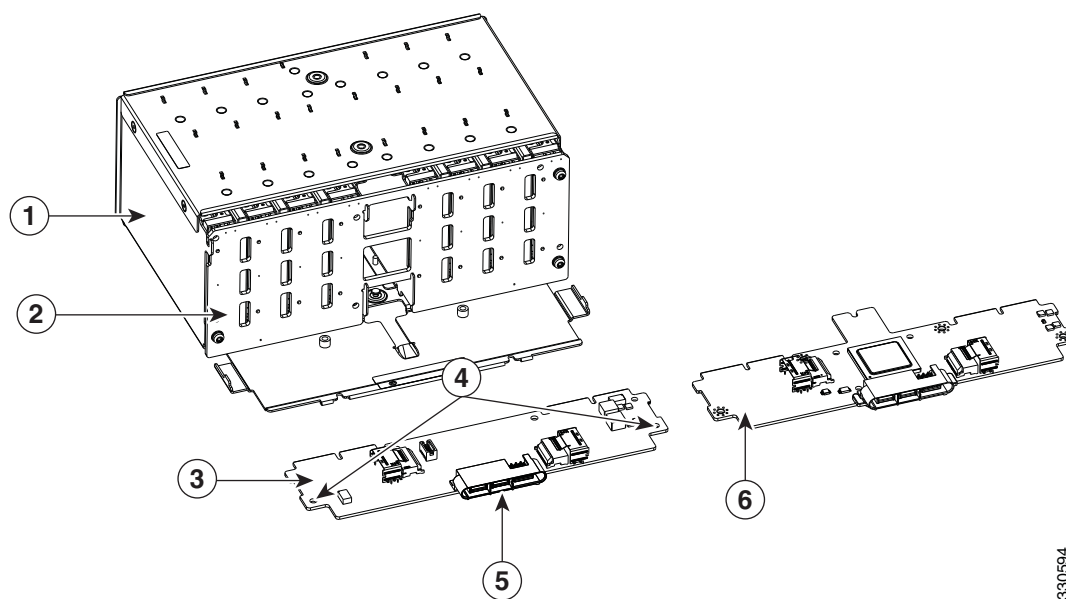
1	Chassis drive bay module (rear view)	4	Transition card securing screws (two)
2	Drive backplane	5	Transition card connector to motherboard
3	Transition card (non-expander version)	6	Transition card (expander version)

To install or replace the modular drive bay assembly, follow these steps:

Step 1 Remove the assembly that you are replacing. See Figure 3-8 and Figure 3-9:

   a. Power off the server as described in the "Shutting Down and Powering Off the Server" section on page 3-7.

   b. Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.

⚠ **Caution** If you cannot safely view and access the component, remove the server from the rack.

   c. Remove the top cover as described in "Removing and Replacing the Server Top Cover" section on page 3-8.

   d. Remove all drives from the drive-bay module that you are replacing.

   e. Remove all memory risers from the front memory compartment (see Figure 3-9).

   Lift on the blue plastic handle on the top panel of the riser to disengage the latches at each end, and then pull the riser from its motherboard socket. See Replacing Memory Risers, page 3-21 for more information.

🔎 **Tip** When you remove the memory risers, set them on an anti-static mat in the same order that they were removed. This will help you keep the same matched pairs of risers (as required) when you reinstall them.

   f. Remove the fan tray from the chassis, as described in Replacing a Fan Tray, page 3-19. You do not have to remove the fan modules from the fan tray.

   g. Disconnect RAID controller cables from the transition card that you are replacing.

🔎 **Tip** Label the cables before you disconnect them to aid replacement.

   h. Use a Number 1 Phillips-head screwdriver to remove the two screws that secure the transition card to the chassis floor (see Figure 3-9).

   i. Slide the drive bay with attached backplane and transition card out the front of the chassis. The transition card disengages from its motherboard connector.

✎ **Note** Tilt the module downward as you slide it out the chassis opening to provide clearance over an alignment peg on the chassis floor.

Step 2   Install a new drive bay assembly:

    a. Carefully slide the drive bay with attached backplane and transition card into the front chassis opening.

        Stop when the connector on the rear edge of the transition card is fully engaged with the motherboard connector and the front of the drive bay is even with the chassis front panel.

    b. Replace the two screws that secure the transition card to the chassis floor.

    c. Replace the RAID controller cables to the connectors on the transition card.

    d. Replace the fan tray as described in Replacing a Fan Tray, page 3-19.

    e. Replace all memory risers to the front compartment.

        Use the alignment keys in the motherboard sockets to orient the risers correctly.

    f. Replace the top cover.

    g. Replace the server in the rack, replace cables, and then power on the server by pressing the **Power** button.

Figure 3-9   *Removing and Replacing the Drive-Bay Module, Backplane, and Transition Card*
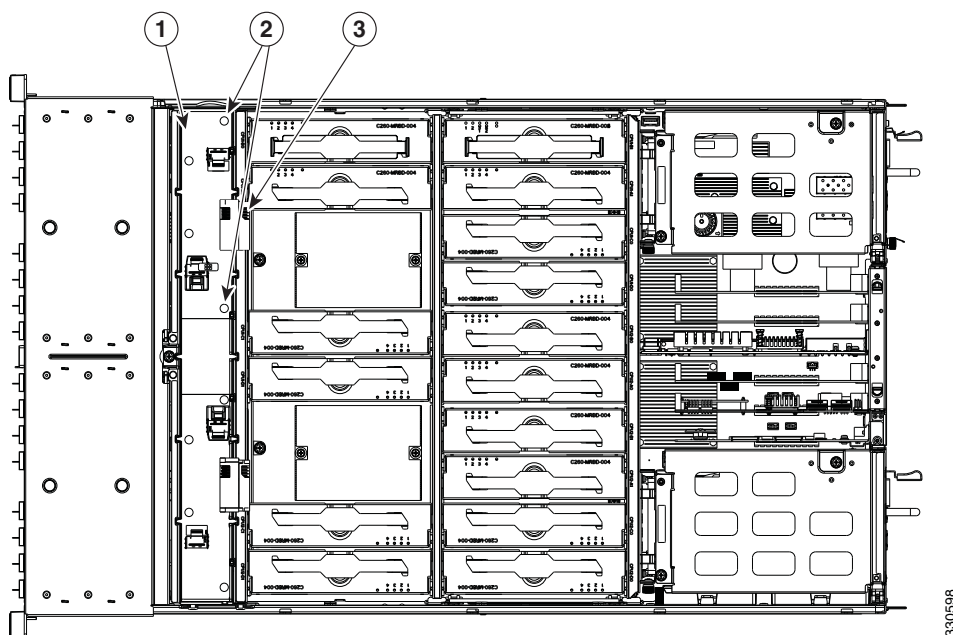
1	Transition card on chassis floor (shown with fan tray removed)	3	Transition card connector to motherboard
2	Transition card securing screws (2)		–

Replacing Fan Modules

The six fan modules in the server are numbered as follows when you are facing the front of the server.

Figure 3-10   *Fan Module Numbering*

FAN 1	FAN 2	FAN 3	FAN 4	FAN 5	FAN 6

Tip Each fan module has a fault LED that lights amber if the fan module fails.

To replace or install a hot-pluggable fan module, follow these steps:

Caution You do not have to shut down or power off the server to replace fan modules because they are hot-pluggable. However, to maintain proper cooling, do not operate the server for more than one minute with any fan module removed.

Step 1 Remove the fan module that you are replacing (see Figure 3-11):

  a. Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.

Caution If you cannot safely view and access the component, remove the server from the rack.

  b. Remove the top cover as described in "Removing and Replacing the Server Top Cover" section on page 3-8.

  c. Insert your thumb and forefinger into the two release latches on the top of the fan module.

  d. Squeeze the release latches together and lift out the fan module.

Step 2 Install a new fan module:

  a. Grasp the fan module by the release latches and align it with the empty fan bay and the connector on the floor of the fan tray. See Figure 3-11.

  b. Press down on the top corners of the fan module until the connector is fully seated and the release latches lock in place.

  c. Replace the top cover.

  d. Replace the server in the rack.

Figure 3-11   *Removing and Replacing Fan Modules*
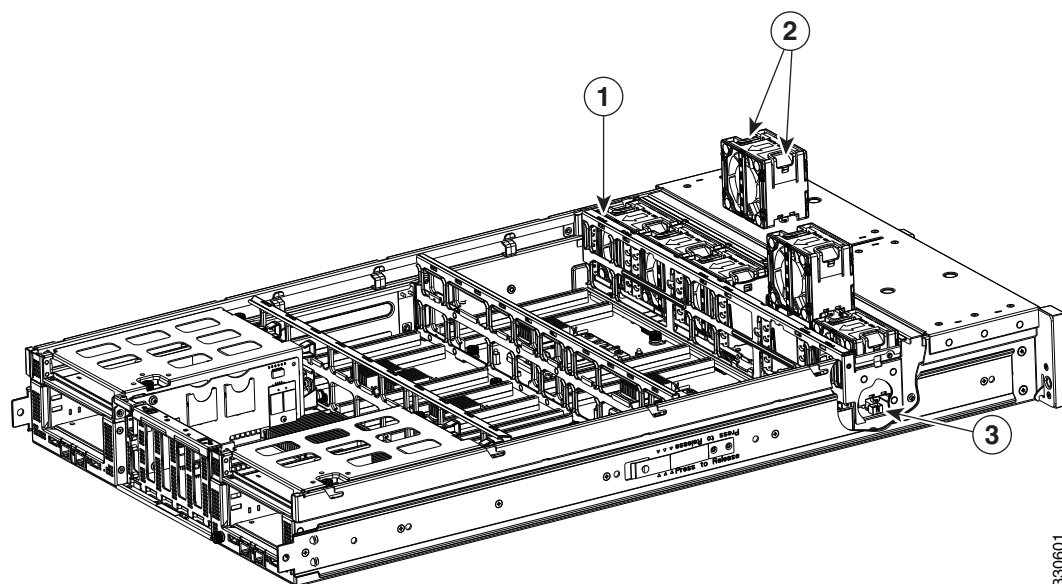
1	Fan tray	3	Connector location on underside of fan module
2	Fan module release latches		–

Replacing a Fan Tray

To replace a fan tray, follow these steps:

Step 1   Remove the fan tray that you are replacing (see Figure 3-12):

a. Power off the server as described in the "Shutting Down and Powering Off the Server" section on page 3-7.

b. Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.

⚠️
Caution   If you cannot safely view and access the component, remove the server from the rack.

c. Remove the top cover as described in "Removing and Replacing the Server Top Cover" section on page 3-8.

d. Remove all memory risers from the front compartment to provide clearance.

🔍
Tip   Note the locations of the memory risers before you remove them to assist you in replacing them.

e. Use a Number 1 Phillips-head screwdriver to loosen the three captive thumbscrews that secure the fan tray to the chassis.

f. Lift the fan tray straight up and out of the chassis.

⚠️
Caution   Be careful to avoid bumping the motherboard components with the fan tray so that you do not damage them or their solder connections to the motherboard.

Step 2   Install a new fan tray (see Figure 3-12):

a. Carefully align the new tray with the chassis and lower it in place:

– Align the connector on the underside of the tray with its socket on the motherboard.

– Align the two guide pegs on each end of the tray with the slots in the chassis.

b. Use a Number 1 Phillips-head screwdriver to tighten the three captive thumbscrews that secure the tray to the motherboard and chassis.

c. Replace the memory risers that you removed. Be sure to observe the configuration rules as described in Memory Riser Population Guidelines, page 3-21.

d. Replace the top cover.

e. Replace the server in the rack, replace cables, and then power on the server by pressing the **Power** button.

Figure 3-12   *Removing and Replacing a Fan Tray*
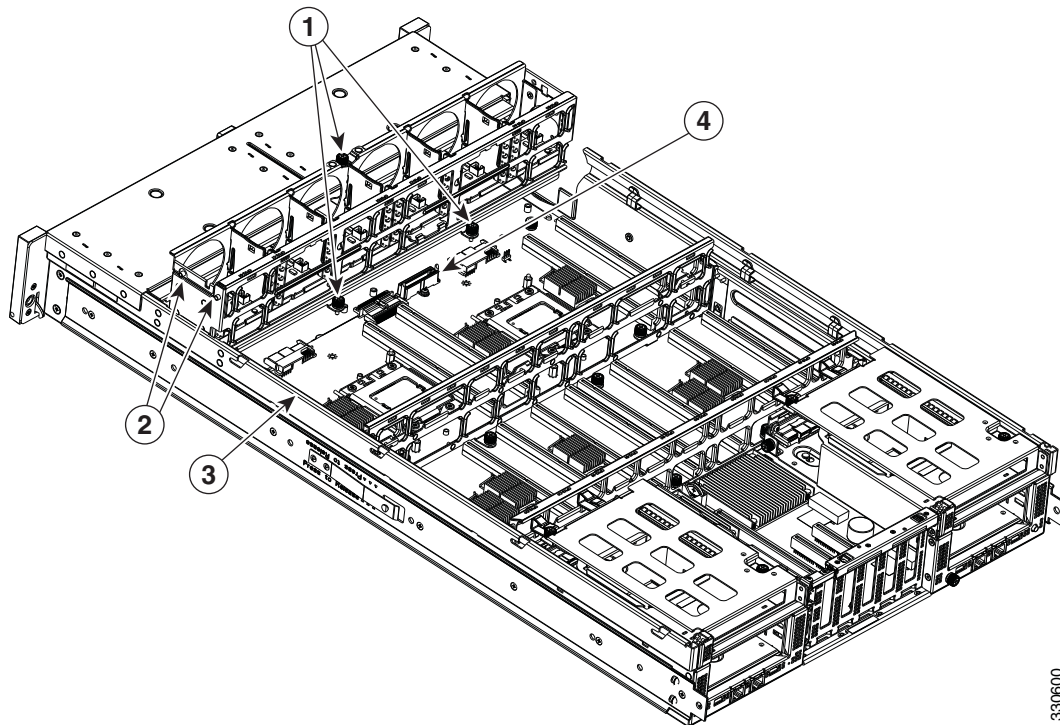
| **1** | Captive thumbscrews (3) | **3** | Front compartment |
| **2** | Guide pegs (2 on each end of fan tray) | **4** | Motherboard connector location, underneath fan tray |

Replacing Memory Risers

This section describes how to remove and replace memory risers. For information about replacing DIMMs on the memory risers, see Replacing DIMMs, page 3-25.

This section includes the following topics:

The memory risers connect to motherboard sockets. There are two versions of memory riser available for use in this server:

- The two-DIMM riser is a passive riser with two DIMM sockets.
- The four-DIMM riser is an active riser that utilizes an ASIC chipset to double the capacity to four DIMM sockets.

Memory Riser Population Guidelines

Figure 3-13 shows the CPUs and memory riser sockets on the motherboard.

Each CPU controls eight Millbrook-2 DDR3 channels. There is one memory riser for each DDR3 channel.

Use the following population guidelines when installing or replacing memory risers:

- The server must have either all two-DIMM risers or all four-DIMM risers. Do not mix riser types.
- Memory risers must be installed in pairs on paired DDR3 channels. The paired channels are as follows:
    - CPU1— [A0:A1], [B0:B1], [C0:C1], [D0:D1]
    - CPU2— [A0:A1], [B0:B1], [C0:C1], [D0:D1]
- Matched pairs of risers on paired DDR3 channels must have identical DIMM configurations.

    For example, the DIMM configurations must be identical on risers in A0:A1; however, the A0:A1 configurations do not have to be identical with the B0:B1 configurations.

- The minimum riser configuration is one matched pair of risers on either CPU1 or CPU2. Either CPU can boot and run from a single matched pair of risers.
- Any riser installed on a socket that is controlled by an absent CPU is not recognized.
- Although it is not required, for optimal performance distribute riser pairs evenly across the CPUs. Follow this recommended installation order (see Figure 3-13):

    1. CPU1 [A0:A1] and CPU2 [A0:A1]
    2. CPU1 [C0:C1] and CPU2 [C0:C1]
    3. CPU1 [B0:B1] and CPU2 [B0:B1]
    4. CPU1 [D0:D1] and CPU2 [D0:D1]

Figure 3-13   Memory Riser Sockets on Motherboard
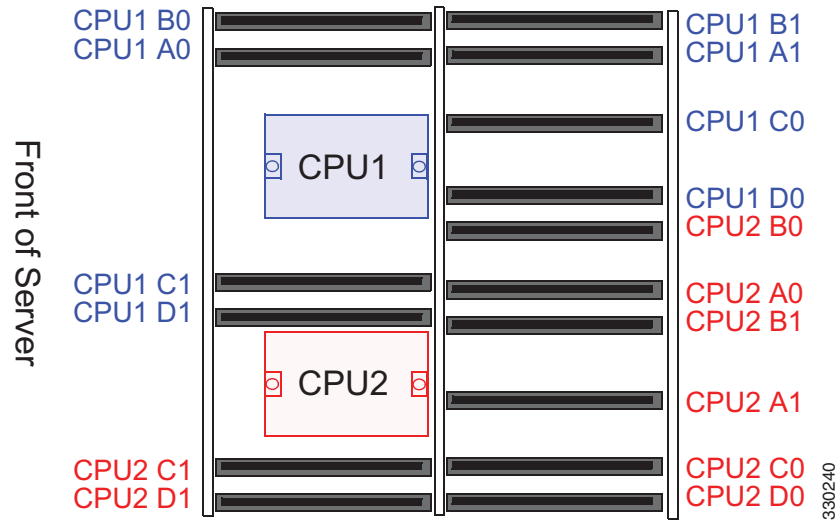
Identifying a Faulty Memory Riser or DIMM

The memory riser includes fault LEDs on its top panel so that you can identify which riser is faulty or which riser contains faulty DIMMs (see Figure 3-14).

- If one or more of the numbered DIMM fault LEDs are lit, replace the corresponding DIMMs as described in Replacing DIMMs, page 3-25.
- If the riser fault LED is lit, replace the memory riser as described in Memory Riser Replacement Procedure, page 3-23.

Figure 3-14   Memory Riser Fault LEDs
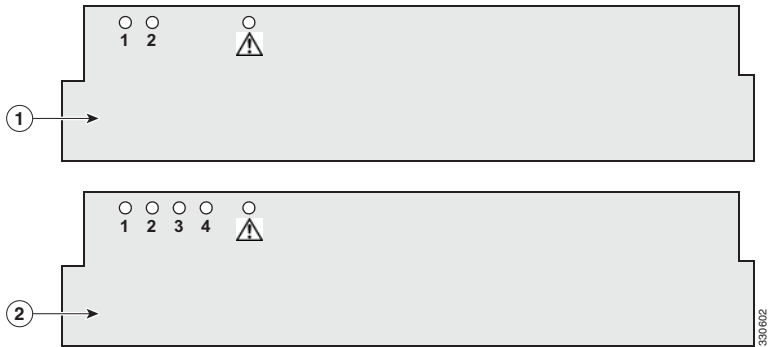
1	Two-DIMM riser top panel	2	Four-DIMM riser top panel

Memory Riser Replacement Procedure

To replace or install a memory riser, follow these steps:

Step 1   Remove the memory riser that you are replacing: See Figure 3-15:

   a.   Power off the server as described in the "Shutting Down and Powering Off the Server" section on page 3-7.

   b.   Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.

⚠
Caution   If you cannot safely view and access the component, remove the server from the rack.

   c.   Remove the top cover as described in "Removing and Replacing the Server Top Cover" section on page 3-8.

   d.   Lift on the blue plastic handle on the top panel of the riser to disengage the latches at each end, and then pull the riser from the motherboard socket.

The blue plastic handle is the release mechanism.

   e.   If you are installing or replacing DIMMs on the memory riser, use the instructions in Replacing DIMMs, page 3-25.

Step 2   Install a new memory riser:

✎
Note   Before installing memory risers or DIMMs, refer to the population guidelines. See Memory Riser Population Guidelines, page 3-21 and DIMM Performance Guidelines and Population Rules, page 3-25.

   a.   Align the riser with the empty motherboard connector.

✎
Note   The risers face in alternating directions. Use the alignment keys in the motherboard socket to orient the riser correctly. See Figure 3-15.

   b.   Simultaneously press down on both top corners of the riser top panel to ensure that it is properly seated in the motherboard connector. Keep the riser vertical without tilting it at an angle.

   c.   Replace the top cover.

   d.   Replace the server in the rack, replace cables, and then power on the server by pressing the **Power** button.

Figure 3-15   Removing and Replacing Memory Risers
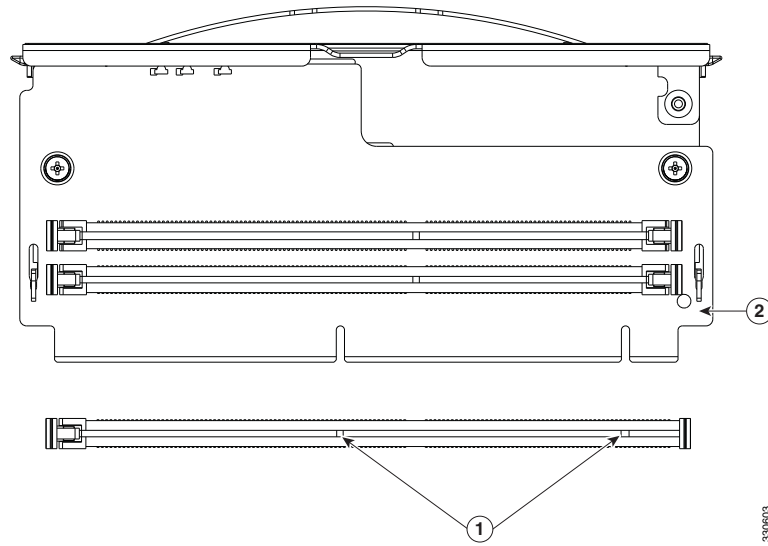
1	Alignment keys in motherboard socket	**2**	Memory riser

Replacing DIMMs

This section includes the following topics:

⚠

Caution   DIMMs and their sockets are fragile and must be handled with care to avoid damage during installation.

⚠

Caution   Cisco does not support 3rd-party DIMMs. Using non-Cisco DIMMs in the server might result in system problems or damage to the motherboard.

✎

Note   To ensure the best server performance, it is important that you are familiar with memory performance guidelines and population rules before you install or replace memory.

DIMM Performance Guidelines and Population Rules

This section describes the type of memory that the server requires and its effect on performance. The section includes the following topics:

DIMM Sockets

Figure 3-16 shows the numbering of the DIMM slots on the two types of memory risers.

Figure 3-16   DIMM Slots on Memory Risers
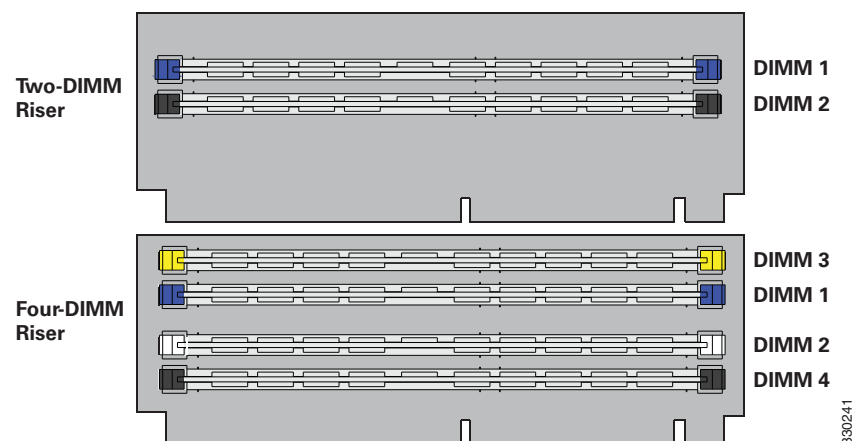
DIMM Population Rules

Observe the following guidelines when installing or replacing DIMMs:

- The minimum memory riser configuration is one matched pair of memory risers on either CPU1 or CPU2. See Replacing Memory Risers, page 3-21 for more detail on memory riser population.

- Matched pairs of risers on paired DDR3 channels must have identical DIMM configurations.

  For example, the DIMM configurations must be identical on risers in A0:A1; however, the A0:A1 configurations do not have to be identical with the B0:B1 configurations.

- Any DIMM installed in a memory riser corresponding to an empty CPU slot becomes inaccessible.

- Two-DIMM memory riser population rules are as follows:

  - The two-DIMM riser can operate with one or two DIMMs installed.

  - Both DIMMs installed on any one riser must be identical.

  - Populate the slots in this order: 1, 2. See Figure 3-16.

- Four-DIMM memory riser population rules are as follows:

  - The four-DIMM riser can operate with one, two, three, or four DIMMs installed.

  - All DIMMs installed on any one riser must be identical.

  - Populate the slots in this order: 1, 2, 3, 4. See Figure 3-16.

DIMM Sparing and Rank Sparing

DIMM and rank sparing can be enabled in the BIOS configuration utility.

Sparing involves utilizing one of the DIMM pairs or rank pairs within each memory riser as a spare unit. When any of the other DIMM pairs within the same memory riser experiences errors beyond a pre-defined threshold, it fails over to the spare DIMM pair. Spared DIMMs and ranks are hidden from the user and the OS so that the BIOS can migrate to a spare unit when it finds degrading DIMMs.

When sparing is enabled, the available system memory is lesser than the total installed memory.

- When using DIMM sparing, the available memory equals total installed memory minus the size of spared DIMMs.

- When using rank sparing, available memory equals total installed memory minus the size of the spared ranks. Rank size equals DIMM size divided by the number of ranks.

DIMM Replacement Procedure

This section includes the following topics:

- Identifying a Faulty Memory Riser or DIMM, page 3-27
- Replacing DIMMs, page 3-27

Identifying a Faulty Memory Riser or DIMM

The memory riser includes fault LEDs on its top panel so that you can identify which riser is faulty or which riser contains faulty DIMMs (see Figure 3-14).

- If one or more of the numbered DIMM fault LEDs are lit, replace the corresponding DIMMs as described in Replacing DIMMs, page 3-25. See Figure 3-16 on page 3-25 for the DIMM slot numbering on the riser.
- If the riser fault LED is lit, replace the memory riser as described in Memory Riser Replacement Procedure, page 3-23.

Replacing DIMMs

To install a DIMM assembly, follow these steps:

Step 1   Remove the DIMMs that you are replacing:

a.   Power off the server as described in the "Shutting Down and Powering Off the Server" section on page 3-7.

b.   Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.

⚠️
Caution   If you cannot safely view and access the component, remove the server from the rack.

c.   Remove the top cover as described in "Removing and Replacing the Server Top Cover" section on page 3-8.

d.   Identify the memory riser that contains the faulty DIMM. See Identifying a Faulty Memory Riser or DIMM, page 3-22.

e.   Lift on the blue plastic handle on the top panel of the riser to disengage the latches at each end, and then pull the riser from the motherboard socket.

f.   Locate the faulty DIMM and remove it from the socket on the memory riser by opening the ejector levers at both ends of the DIMM socket.

Step 2   Install a new DIMM:

✎
Note   Before installing risers or DIMMs, refer to the population guidelines. See Memory Riser Population Guidelines, page 3-21 and DIMM Performance Guidelines and Population Rules, page 3-25.

a.   Align the new DIMM with the socket on the memory riser. Use the alignment key in the DIMM socket to correctly orient the DIMM.

b.   Push the DIMM into the connector until it is fully seated and the ejector levers on either side of the connector lock into place.

   **c.** Align the memory riser with the empty motherboard connector.

✎
Note   Memory risers face in alternating directions. Use the alignment keys in the motherboard socket to orient the riser correctly. See Figure 3-15.

    d. Simultaneously press down on both top corners of the riser to ensure that it is properly seated in the motherboard connector. Keep the riser vertical without tilting it at an angle.

    e. Replace the top cover.

    f. Replace the server in the rack, replace cables, and then power on the server by pressing the **Power** button.

Replacing CPUs and Heatsinks

This server has two CPUs. Each CPU supports eight memory risers connected by serial memory interface (SMI). See Figure 3-17.

⚠️
Caution   CPUs and their motherboard sockets are fragile and must be handled with care to avoid damaging pins during installation. The CPUs must be installed with heatsinks and their thermal pads to ensure proper cooling. Failure to install a CPU correctly might result in damage to the server.

Figure 3-17   CPUs and Memory Riser Sockets
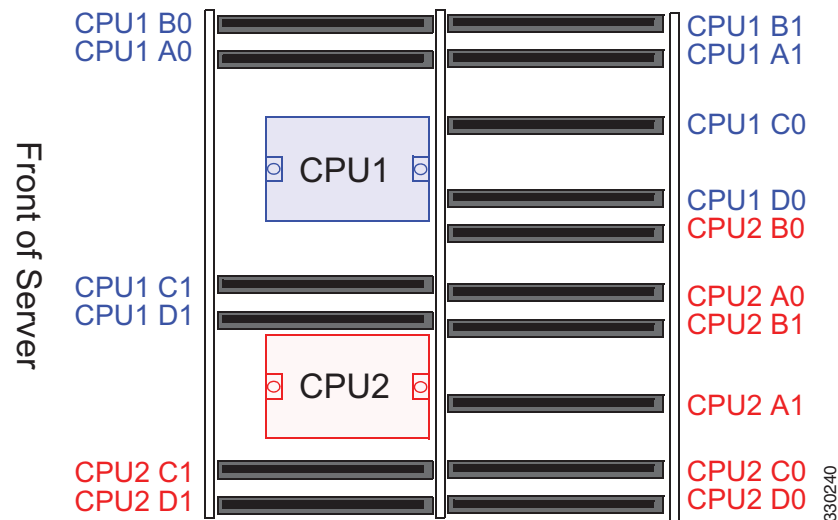
This section contains the following topics:

- Additional CPU-Related Parts To Order With RMA Replacement Motherboards, page 3-30
- CPU replacement Procedure, page 3-30

Additional CPU-Related Parts To Order With RMA Replacement Motherboards

When a return material authorization (RMA) of the motherboard or CPU is done on a Cisco UCS C-series server, there are additional parts that might not be included with the CPU or motherboard spare bill of materials (BOM). The TAC engineer might need to add the additional parts to the RMA to help ensure a successful replacement.

- Scenario 1—You are re-using the existing heatsinks:
  - Heat sink cleaning kit (UCSX-HSCK=)
  - Thermal grease kit for C260 (UCS-CPU-GREASE=)
- Scenario 2—You are replacing the existing heatsinks:
  - Heat sink (UCSC-HS-01-C260=)
  - Heat sink cleaning kit (UCSX-HSCK=)

A CPU heatsink cleaning kit is good for up to four CPU and heatsink cleanings. The cleaning kit contains two bottles of solution, one to clean the CPU and heatsink of old thermal interface material and the other to prepare the surface of the heatsink.

New heatsink spares have preinstalled thermal interface material covered by a small sheet of plastic. It is important to clean the old thermal interface material off of the CPU prior to installing the heatsinks. Therefore, when ordering new heatsinks it is still necessary to order the heatsink cleaning kit at a minimum.

CPU replacement Procedure

To install or replace a CPU heatsink and CPU, follow these steps:

Step 1   Remove the CPU and heatsink that you are replacing:

a.   Power off the server as described in the "Shutting Down and Powering Off the Server" section on page 3-7.

b.   Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.

⚠
Caution   If you cannot safely view and access the component, remove the server from the rack.

c.   Remove the top cover as described in "Removing and Replacing the Server Top Cover" section on page 3-8.

d.   Use a Number 2 Phillips-head screwdriver to loosen the two captive screws that secure the heatsink and lift it off of the CPU. See Figure 3-18.

✎
Note   Alternate loosening each screw evenly to avoid damaging the heatsink or CPU.

e.   Unclip the CPU retaining latch and open the hinged the CPU cover plate. See Figure 3-18.

f.   Lift the CPU out of the socket and set it aside on an antistatic mat or in an antistatic bag.

Figure 3-18   *CPU Latching Mechanism*
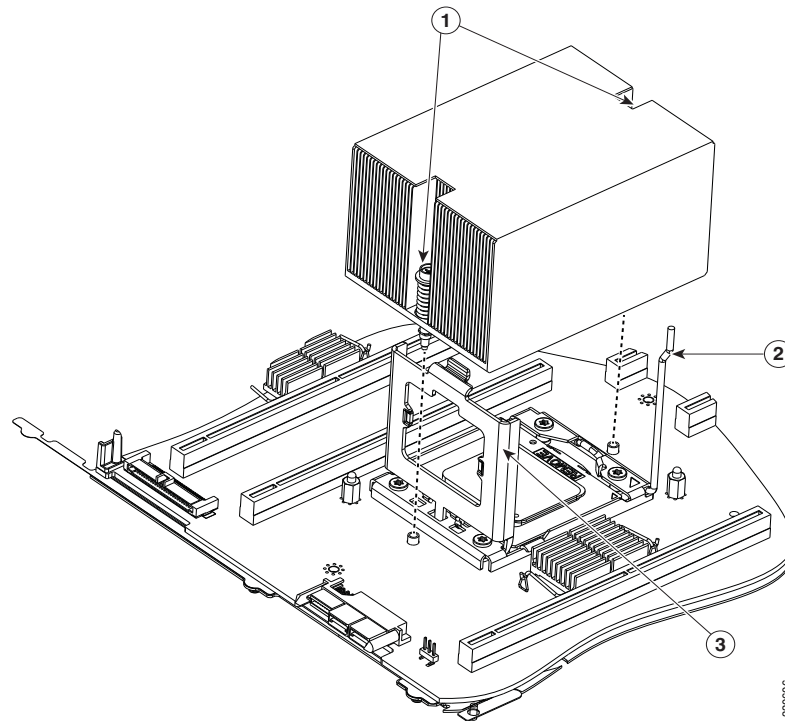
1	Heatsink captive screws	**3**	CPU cover plate
2	CPU retaining latch		–

Step 2   Install a new CPU:

  a. Insert the replacement CPU in the socket.

  Note   Orient the CPU alignment notches with the alignment keys in the socket. See Figure 3-19.

  b. Close the CPU cover plate and clip down the CPU retaining latch.

Figure 3-19   CPU Socket Alignment Keys
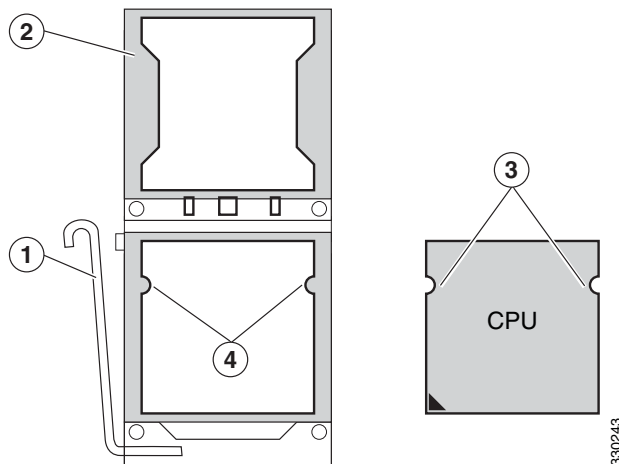
1	CPU retaining latch	3	CPU alignment notches
2	CPU cover plate	4	CPU socket alignment keys

Step 3   Install a heatsink:

⚠
Caution   The heatsink must have a new, undamaged thermal pad on the heatsink-to-CPU surface to ensure proper cooling. If you are replacing a heatsink that was previously installed, you must remove the old thermal pad. If you are installing a new heatsink, skip to step c. below.

a.   Apply an alcohol-based cleaning solution to the old thermal pad and let it soak for a least 15 seconds.

b.   Wipe all of the old thermal pad off the heatsink using a soft cloth that will not scratch the heatsink surface.

⚠
Caution   Damage to the heatsink surface can damage the heat transferring properties of the heatsink.

c.   Peel the protective film from the thermal pad that is on the bottom of the new heatsink.

d.   Align the heatsink captive screws with the motherboard standoffs, then use a Number 2 Phillips-head screwdriver to tighten the captive screws evenly until the screws stop against the captive springs.

✎
Note   Alternate tightening each screw evenly to avoid damaging the heatsink or CPU.

e.   Replace the top cover.

f.   Replace the server in the rack, replace cables, and then power on the server by pressing the **Power** button.

Replacing the Motherboard RTC Battery

Warning   **There is danger of explosion if the battery is replaced incorrectly. Replace the battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.** [Statement 1015]

The CMOS real-time clock (RTC) battery retains system settings when the server is disconnected from power. The battery type is Panasonic CR2032 or equivalent.

To replace or install the motherboard CMOS battery, follow these steps:

Step 1   Remove the CMOS battery (see Figure 3-20):

   a. Power off the server as described in the "Shutting Down and Powering Off the Server" section on page 3-7.

   b. Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.

Caution   If you cannot safely view and access the component, remove the server from the rack.

   c. Remove the top cover as described in "Removing and Replacing the Server Top Cover" section on page 3-8.

   d. Locate the CMOS battery. See Figure 3-20.

   e. Bend the battery retaining clip away from the battery and use a pair of needle-nose pliers to pull the battery from the socket.

Step 2   Install a CMOS battery:

   a. Bend the retaining clip away from the battery socket and insert the battery in the socket.

Note   The positive side of the battery marked "3V+" should face the retaining clip.

   b. Push the battery into the socket until it is fully seated.

Note   Ensure that the retaining clip clicks over the top of the battery.

   c. Replace the top cover.

   d. Replace the server in the rack, replace cables, and then power on the server by pressing the **Power** button.

Figure 3-20   Removing and Replacing the Motherboard RTC Battery
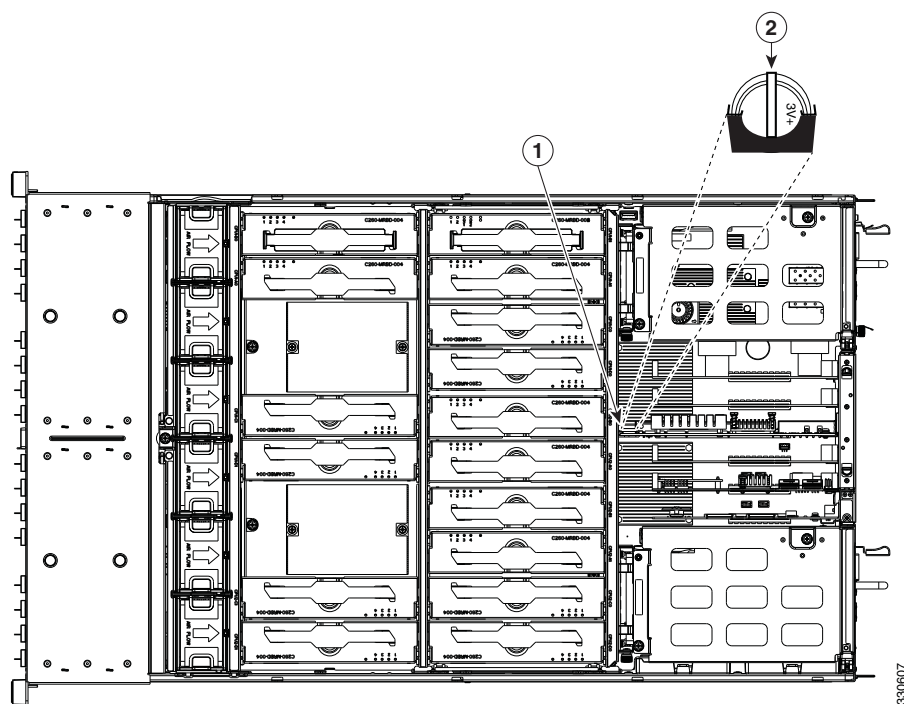
1	RTC battery socket on motherboard	2	Retaining clip (enlarged view)

Replacing a PCIe Riser Assembly

The server contains two PCIe risers for horizontal installation of PCIe cards. These risers wrap around the power supply bays and connect to dedicated PCIe slots 1 and 7 on the motherboard. These risers each provide one standard-profile, half-length, x16 horizontal slot.

To install or replace a PCIe riser assembly, follow these steps:

Step 1 Remove the PCIe riser assembly that you are replacing (see Figure 3-21):

a. Power off the server as described in the "Shutting Down and Powering Off the Server" section on page 3-7.

b. Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.

⚠
Caution If you cannot safely view and access the component, remove the server from the rack.

c. Remove the top cover as described in "Removing and Replacing the Server Top Cover" section on page 3-8.

d. Use a Number 2 Phillips-head screwdriver to loosen the two captive thumbscrews that secure the PCIe riser assembly.

e. Lift straight up on both ends of the PCIe riser assembly to disengage its circuit board from the socket on the motherboard.

Step 2 Install a new PCIe riser assembly.

a. Set the PCIe riser assembly back in place over the power supply bay.

b. Align the circuit board edge with the socket on the motherboard and then push straight down on both ends of the assembly to fully engage the board with the socket.

c. Tighten the two captive thumbscrews that secure the riser assembly in place.

d. Replace the top cover.

e. Replace the server in the rack, replace cables, and then power on the server by pressing the **Power** button.

Figure 3-21   Removing and Replacing the PCIe Riser Assembly
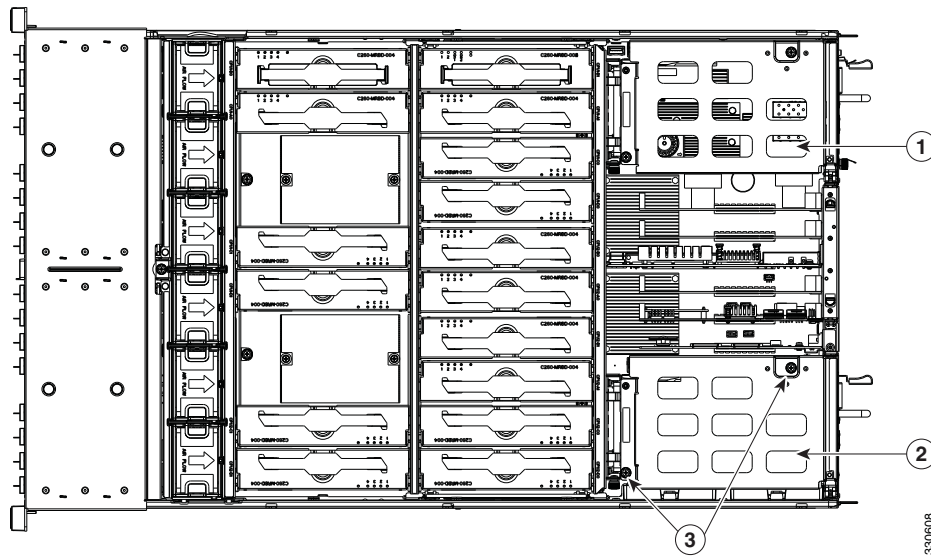
1	PCIe riser assembly in PCIe slot 7	**3**	Riser assembly captive thumbscrews
2	PCIe riser assembly in PCIe slot 1		–

Replacing an I/O Riser

The I/O riser is a modular PCIe form-factor card that has a designated motherboard socket inside the server (see Figure 3-23). The module provides the external VGA video and RS-232 serial connectors for the rear panel of the server. See Figure 3-22.

The I/O riser also provides two internal slots for Cisco FlexFlash cards. For more information about Cisco FlexFlash cards, see Replacing a Cisco Flexible Flash Card, page 3-39.

Figure 3-22   I/O Riser, Including Cisco FlexFlash Slots
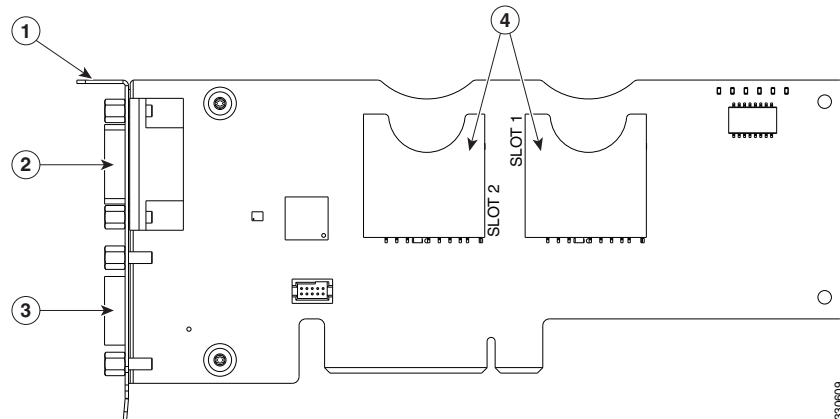
1	I/O riser rear panel tab	**3**	VGA video connector (15-pin)
2	RS-232 Serial connector (9-pin)	**4**	Internal Cisco FlexFlash card slots

To install or replace an I/O riser, follow these steps:

Step 1   Remove the I/O riser that you are replacing (see Figure 3-23):

a. Power off the server as described in the "Shutting Down and Powering Off the Server" section on page 3-7.

b. Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.

Caution   If you cannot safely view and access the component, remove the server from the rack.

c. Remove the top cover as described in "Removing and Replacing the Server Top Cover" section on page 3-8.

d. Disconnect any external cables from the I/O riser ports.

e. Use a Number 1 Phillips-head screwdriver to remove the single screw that secures the I/O riser rear panel tab to the chassis.

f. Lift the I/O riser straight up from the motherboard connector.

Note   Lift up on both ends of the I/O riser evenly to avoid damaging its connector.

Step 2 Install a new I/O riser:

a. Align the new I/O riser with its empty designated socket on the motherboard. See Figure 3-23.

> **Note** You must install the I/O riser in its designated motherboard socket.

b. Push down evenly on both ends of the I/O riser until it is fully seated in its motherboard socket.

c. Ensure that the I/O riser rear panel tab sits flat against the chassis rear panel opening.

d. Install the single screw that secures the I/O riser to the chassis.

e. Replace the top cover.

f. Replace the server in the rack, replace cables, and then power on the server by pressing the **Power** button.

Figure 3-23   Removing and Replacing an I/O Riser
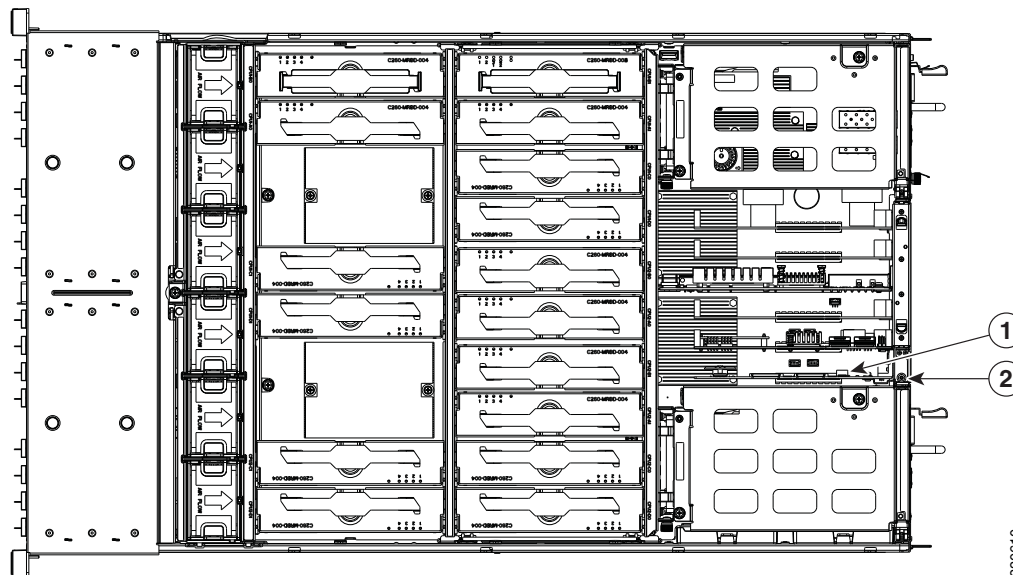

1	I/O riser in designated motherboard socket	2	I/O riser securing screw

Replacing a Cisco Flexible Flash Card

This section includes the following topics:

Overview of the Pre-Installed Cisco FlexFlash Card

> **Note** At this time, dual Cisco FlexFlash cards are not supported. Your Cisco FlexFlash card must be installed in SD card slot 1 on the I/O riser (see Figure 3-22).

This server is shipped from the factory with one pre-installed Cisco FlexFlash card. The slots for these cards are on the I/O riser (see Replacing an I/O Riser, page 3-37).

The Cisco FlexFlash card is pre-installed with three software bundles, each on one of four preconfigured virtual drives (VDs). The fourth VD allows you to install an OS or embedded hypervisor.

The VDs are configured as follows:

1. Cisco UCS Server Configuration Utility (SCU).
2. Hypervisor (HV). This is a VD that you can use for your own purposes.
3. Cisco Drivers (Drivers).
4. Cisco Host Upgrade Utility (HUU).

Enabling a Cisco FlexFlash Virtual Drive

Each of the VDs on the pre-installed Cisco FlexFlash card can be separately enabled or hidden from the host. The default as shipped from the factory is for all VDs to be hidden.

To enable VDs and expose them to the host, follow these steps:

Step 1   Log in to CIMC interface for the server, using the IP address of the server.

Step 2   Navigate through GUI tabs to **Server > Inventory > Storage**.

Step 3   Click **FlexFlash-0** in the Storage Adapters list.

Step 4   Click on **Configure Operational Profile** in the Actions area.

The Operational Profile dialog opens.

Step 5   Check the box for each VD that you want to enable and expose to the host, then click **Save Changes**.

Booting a Cisco FlexFlash Virtual Drive

When you want to access the Cisco SCU or Cisco HUU software, you boot its VD with a one-time boot option. When you want to boot the hypervisor (HV) VD, you boot it with a permanent boot order selection. See the following topics in this section:

Booting the Cisco SCU and Cisco HUU Software VDs

You can access the preinstalled Cisco SCU and Cisco HUU software bundles on a Cisco FlexFlash card by booting their respective VDs with a one-time boot option:

Step 1   Enable the SCU or HUU VD.

See .

Step 2   In the CIMC GUI interface, navigate through the tabs to **Server > BIOS.**

Step 3   Click **Configure Boot Override Priority**.

The Boot Override Priority dialog opens.

Step 4   Pull down the menu and select **SCU** or **HUU**, then click **OK**.

Step 5   Reboot the server.

The server boots the selected VD.

Note   This is a one-time boot option. After running Cisco SCU or Cisco HUU, the server returns to its previously configured boot path.

Booting the Hypervisor VD

You can boot the hypervisor (HV) VD with a more permanent boot selection. (To change the boot order one time, use the procedure in .

To permanently set the boot order for an HV VD, use the following steps:

Step 1   Boot the server and watch for the prompt to press F2 to open the BIOS Setup utility.

Step 2   When prompted, press **F2** to open the BIOS Setup utility.

Step 3   Navigate to the **Boot Options** tab.

Step 4   Use the Boot Options screen to set the HV VD to your desired boot order for the server.

Monitoring and Managing a Cisco FlexFlash Card

You can monitor and manage your installed Cisco FlexFlash cards by using the CIMC GUI interface or the CLI interface. See the *Cisco UCS C-Series Rack-Mount Server Configuration Guide* or the *Cisco UCS C-Series Rack-Mount Server CLI Configuration Guide* in the documentation roadmap linked below.

The links to these documents are in the C-Series documentation roadmap:

http://www.cisco.com/go/unifiedcomputing/c-series-doc

Synchronizing RAID After Installing a Second Cisco FlexFlash Drive

After you install or replace a second Cisco FlexFlash drive, you must synchronize the RAID partition by using the Cisco UCS Server Configuration Utility (SCU).

The SCU provides an option to synchronize the Hypervisor VD, configured as a RAID-1 disk. This feature is available only when both Cisco FlexFlash drive slots are populated.

When one member slot of the SD card is corrupt, use this option to synchronize the hypervisor data across two members of the RAID-1 virtual disk. You can initiate this synchronization only if two cards are detected and the RAID-1 group is determined as unhealthy (one member is corrupt).

Step 1   Click the Hypervisor Sync icon on the toolbar of the SCU interface.

A dialog prompts you to confirm that you want to synchronize the Hypervisor RAID.

Step 2   Click Yes.

A dialog is displayed when the synchronization is complete.

Step 3   Click OK.

After you click OK, the Hypervisor Sync icon on the toolbar is greyed out.

For more information about the utility, see the Cisco UCS Server Configuration Utility User Guide.

Cisco FlexFlash Card Replacement Procedure

To install or replace a Cisco FlexFlash card, follow these steps:

Step 1   Remove the SD card that you are replacing. See Figure 3-23:

a.   Power off the server as described in the "Shutting Down and Powering Off the Server" section on page 3-7.

b.   Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.

⚠️

Caution   If you cannot safely view and access the component, remove the server from the rack.

c.   Remove the top cover as described in "Removing and Replacing the Server Top Cover" section on page 3-8.

d.   Locate the Cisco FlexFlash card that you are replacing on the I/O riser card. See Figure 3-23.

e.   Push down on the top of the Cisco FlexFlash card, then release it to allow it to spring up in the socket.

    f. Remove the Cisco FlexFlash card from the socket.

    g. Wait 10 seconds for the Cisco FlexFlash management software to recognize and react to the absence of the card.

Step 2 Install a Cisco FlexFlash card:

Note At this time, dual Cisco FlexFlash cards are not supported. Your Cisco FlexFlash card must be installed in SD card slot 1 on the I/O riser (see Figure 3-22).

Note To be usable for Cisco FlexFlash, an SD card must be at least 16 GB in size.

Note Any SD card that is installed into the Cisco FlexFlash slot is configured with the VD partitioning described in Overview of the Pre-Installed Cisco FlexFlash Card, page 3-39. This overwrites data on the SD card where Cisco stores the configuration metadata.

    a. Insert the Cisco FlexFlash card into SD card slot 1 on the I/O riser with the label side facing outward.

    b. Press down on the top of the card until it clicks in the slot and stays in place. The top of the card is level with the top edge of the I/O riser when fully seated.

    c. Replace the top cover.

    d. Replace the server in the rack, replace cables, and then power on the server by pressing the **Power** button.

Replacing a 10-Gb LOM Module

The 10-Gb LOM module is a modular PCIe form-factor card (UCSX-MLOM) that is supported only in PCIe slot 4 (see Figure 3-26). The module provides two external 10-Gb SFP+ connectors for the rear panel of the server.

To install or replace a 10-Gb LOM module, follow these steps:

Step 1   Remove the 10-Gb LOM module that you are replacing (see Figure 3-25):

   a. Power off the server as described in the "Shutting Down and Powering Off the Server" section on page 3-7.

   b. Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.

⚠

Caution   If you cannot safely view and access the component, remove the server from the rack.

   c. Remove the top cover as described in "Removing and Replacing the Server Top Cover" section on page 3-8.

   d. Open the hinged PCIe card retainer. Pinch the two release latches toward the center of the retainer while you lift up on the front edge of the retainer to open it (see Figure 3-24).

Figure 3-24   Hinged PCIe Card Retainer on Rear of Chassis
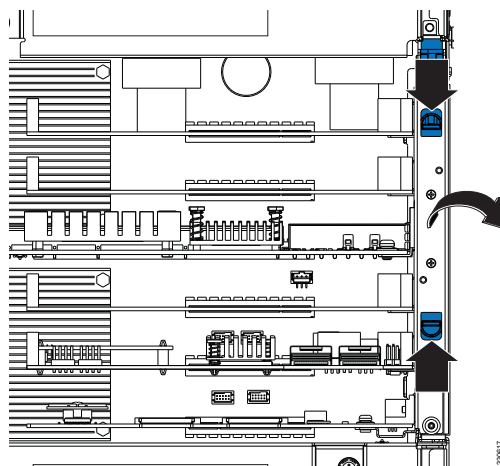
   e. Lift the module straight up from the motherboard socket.

✎

Note   Lift up on both ends of the module evenly to avoid damaging its socket.

Step 2   Install a new 10-Gb LOM module:

   a. Align the new module with the empty PCIe slot 4 socket on the motherboard. See Figure 3-25.

   b. Push down evenly on both ends of the module until it is fully seated in the motherboard socket.

   c. Ensure that the module rear panel sits flat against the chassis rear panel opening.

     d. Close the hinged PCIe retainer and push down on it in the closed position until the latches lock in place.

     e. Replace the top cover.

     f. Replace the server in the rack, replace cables, and then power on the server by pressing the **Power** button.

Figure 3-25   *Removing and Replacing a 10-Gb LOM Module*
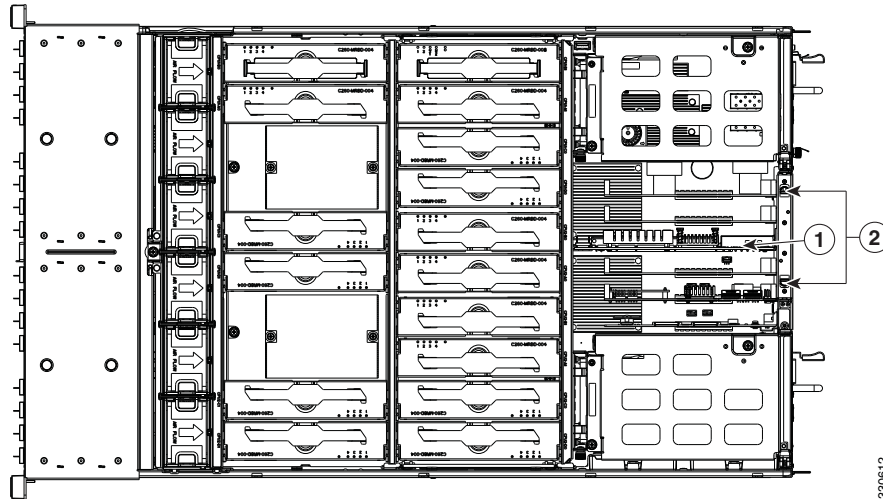
1	10-Gb LOM module in designated PCIe slot 4	**2**	PCI card retainer release latches

Replacing a PCIe Card

> **Caution** Cisco supports all PCIe cards qualified and sold by Cisco. PCIe cards not qualified or sold by Cisco are the responsibility of the customer. Although Cisco will always stand behind and support the C-Series rack-mount servers, customers using standard, off-the-shelf, third-party cards must go to the third-party card vendor for support if any issue with that particular third-party card occurs.

This server has 7 PCIe expansion slots. See Figure 3-26 and Table 3-4 for information about the slots. This section includes the following topics:

- PCIe Slots, page 3-45
- PCIe Configuration Guide, page 3-46
- Replacing a PCIe Card in a Riser Slot, page 3-46
- Replacing a PCIe Card in a Motherboard Slot, page 3-48
- Special Considerations for Cisco UCS Virtual Interface Cards, page 3-50
- Installing Multiple PCIe Cards and Resolving Limited Resources, page 3-51

PCIe Slots

Figure 3-26   PCIe Expansion Slot Locations
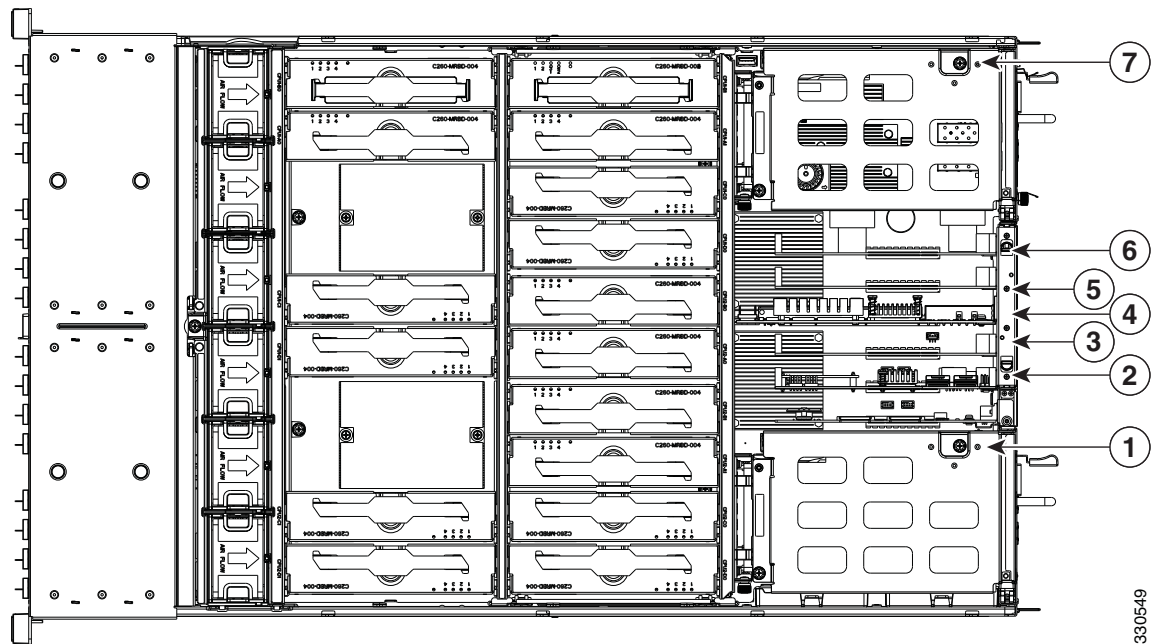
Table 3-4   PCIe Slots

Slot Number	Electrical Lane Width	Connector Length	Card Length[1]	Card Height [2]	NCSI[3] Support
1 (on riser)	Gen-2 x16	x16 connector	1/2 length	Full-height	Yes[4]
2	Gen-2 x4	x8 connector	1/2 length	1/2 height	No
3	Gen-2 x8	x8 connector	1/2 length	1/2 height	No
4	Gen-2 x8	x8 connector	1/2 length	1/2 height	Yes
5	Gen-2 x8	x8 connector	1/2 length	1/2 height	No
6	Gen-2 x8	x8 connector	1/2 length	1/2 height	No
7 (on riser)	Gen-2 x16	x16 connector	1/2 length	Full height	Yes

1. This is the supported length because of internal clearance.
2. This is the size of the rear panel opening.
3. Network Communications Services Interface protocol.
4. Slots 1, 4 and 7 have NCSI support and can operate when the server is in standby power mode.

PCIe Configuration Guide

For the best performance, we recommend that you populate the PCIe slots in the order shown in Table 3-5 for each type of add-on card. For each card type, populate the primary slot first, followed by the secondary slot, then any alternate slots. See Figure 3-26 for the slot locations.

Table 3-5   PCIe Slot Population

PCIe Card Type	Primary Slot	Secondary Slot	Alternate Slots
RAID controller	Slot 3	Slot 5	–
Low-profile (half-height) network adapter	Slot 6	Slot 3 or Slot 4	Slots 1, 2, 5, or 7[1]
Cisco UCS VIC	Slot 7	Slot 1	–
Modular 10-Gb LOM	Slot 4	–	–

1. To use a low-profile card in slots 1 or 7, you must have a standard-profile rear panel attached to the card.

Replacing a PCIe Card in a Riser Slot

Note If you are installing a Cisco UCS Virtual Interface Card, there are prerequisite considerations. See Special Considerations for Cisco UCS Virtual Interface Cards, page 3-50.

To install or replace a PCIe card in standard-profile slots 1 or 7 on the PCIe risers, follow these steps:

Step 1 Remove a PCIe card (or a blank filler panel) from the PCIe riser assembly:

a. Shut down and power off the server as described in the "Shutting Down and Powering Off the Server" section on page 3-7.

b. Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.

⚠

Caution   If you cannot safely view and access the component, remove the server from the rack.

c.   Remove the top cover as described in the "Removing and Replacing the Server Top Cover" section on page 3-8.

d.   Remove any cables from the rear ports of the PCIe card that you are replacing.

🔍

Tip   Label the cables when you disconnect them to aid correct connection to the new card.

e.   Use a Number 2 Phillips-head screwdriver to loosen the two captive thumbscrews that secure the PCIe riser assembly. See Figure 3-21.

f.   Lift straight up on both ends of the PCIe riser assembly to disengage its attached circuit board from the socket on the motherboard.

✎

Note   Lift up on both ends of the PCIe riser evenly to avoid damaging its connector.

g.   Pull evenly on both corners of the PCIe card to remove it from the socket on the PCIe riser assembly.

Step 2   Install a PCIe card:

a.   Align the new PCIe card with the empty socket on the PCIe riser assembly.

b.   Push down evenly on both ends of the card until it is fully seated in the socket.

c.   Ensure that the card rear panel tab sits flat against the PCIe riser rear panel opening.

d.   Set the PCIe riser assembly back in place over the power supply bay.

e.   Align the PCIe riser circuit board edge with the socket on the motherboard and then push straight down on both ends of the PCIe riser assembly to fully engage the board with the socket.

f.   Tighten the two captive thumbscrews that secure the PCIe riser assembly in place.

g.   Replace the top cover.

h.   Replace the server in the rack, replace cables, and then power on the server by pressing the **Power** button.

Figure 3-27   PCIe Riser Assembly Side View
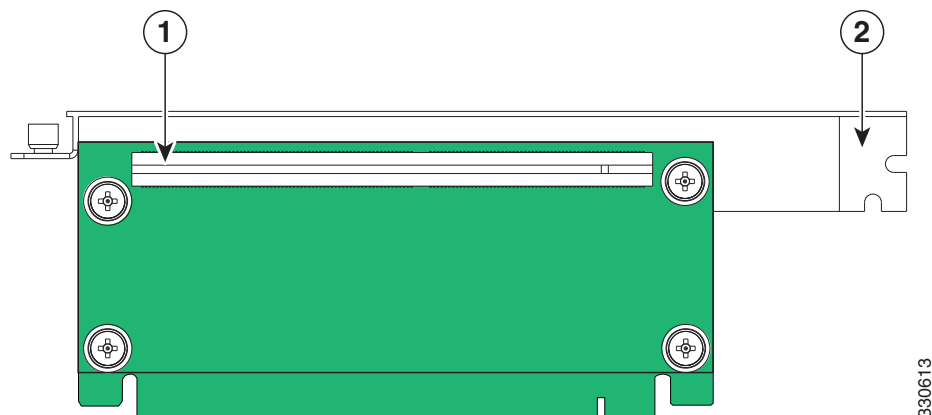
1	PCIe card socket on PCIe riser assembly	2	PCIe card rear panel tab

Replacing a PCIe Card in a Motherboard Slot

Note   If you replace an LSI MegaRAID controller card, you must restore your RAID configuration to the new card. See Restoring RAID Configuration After Replacing a RAID Controller, page C-6.

To install or replace a PCIe card in low-profile motherboard slots 2 through 6, follow these steps:

Step 1   Remove a PCIe card (or a blank filler panel):

a.   Shut down and power off the server as described in the "Shutting Down and Powering Off the Server" section on page 3-7.

b.   Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.

Caution   If you cannot safely view and access the component, remove the server from the rack.

c.   Remove the top cover as described in the "Removing and Replacing the Server Top Cover" section on page 3-8.

d.   Remove any cables from the rear ports of the PCIe card that you are replacing.

Tip   Label the cables when you disconnect them to aid correct connection to the new card.

e.   Open the hinged PCIe card retainer. Pinch the two release latches toward the center of the retainer while you lift up on the front edge of the retainer to open it. See Figure 3-24.

f.   Lift the card straight up from the motherboard connector.

Note Lift up on both ends of the card evenly to avoid damaging its connector.

Step 2 Install a PCIe card:

a. Align the PCIe card with the empty PCIe connector on the motherboard.

b. Push down evenly on both ends of the card until it is fully seated in the motherboard connector.

c. Ensure that the card rear panel sits flat against the chassis rear panel opening.

d. Close the hinged PCIe retainer and push down on it in the closed position until the latches lock in place.

e. Replace the top cover.

f. Replace the server in the rack, replace cables, and then power on the server by pressing the **Power** button.

Step 3 If the card that you replaced is a mass storage controller, restore the RAID configuration on your drives to the new mass storage controller.

See Restoring RAID Configuration After Replacing a RAID Controller, page C-6.

Special Considerations for Cisco UCS Virtual Interface Cards

Table 3-6 describes the requirements for the supported Cisco UCS virtual interface cards (VICs).

Table 3-6   Cisco UCS C260 Requirements for Virtual Interface Cards

Virtual Interface Card (VIC)	Number of VICs Supported in Server	Slots That Support VICs [1]	Primary Slot For UCS Integration or Cisco Card NIC Mode	Minimum CIMC Firmware	Minimum VIC Firmware For Use With UCS Integration	Minimum Nexus OS on an Upstream Nexus Fabric Interconnect
Cisco UCS VIC P81E N2XX-ACPCI01	2	PCIE 1 PCIE 7	PCIE 7	1.4(3)	2.0(2)	5.0
Cisco UCS VIC 1225 UCSC-PCIE-CSC-02	2	PCIE 1 PCIE 7	PCIE 7	1.4(6)	2.1(0)	5.0
Cisco UCS VIC1225T UCSC-PCIE-C10T-02	2	PCIE 1 PCIE 7	PCIE 7[2]	1.5(1)	2.1(1)	5.0

1. See PCIe Slots, page 3-45.

2. The Cisco UCS VIC1225T is not supported for UCS integration at this time.

Installing Multiple PCIe Cards and Resolving Limited Resources

When a large number of PCIe add-on cards are installed in the server, the system may run out of the following resources required for PCIe devices:

- Option ROM memory space
- 16-bit I/O space

The topics in this section provide guidelines for resolving the issues related to these limited resources.

- Resolving Insufficient Memory Space to Execute Option ROMs, page 3-51
- Resolving Insufficient 16-Bit I/O Space, page 3-52

Resolving Insufficient Memory Space to Execute Option ROMs

The system has very limited memory to execute PCIe legacy option ROMs, so when a large number of PCIe add-on cards are installed in the server, the system BIOS might not able to execute all of the option ROMs. The system BIOS loads and executes the option ROMs in the order that the PCIe cards are enumerated (Slot 1, Slot 2, Slot 3, etc.).

If the system BIOS does not have sufficient memory space to load any PCIe option ROM, it skips loading that option ROM, reports a system event log (SEL) event to the CIMC controller and reports the following error in the Error Manager page of the BIOS Setup utility:

```
ERROR CODE  SEVERITY    INSTANCE    DESCRIPTION
146         Major       N/A         PCI out of resources error.
                                    Major severity requires user
                                    intervention but does not
                                    prevent system boot.
```

To resolve this issue, disable the Option ROMs that are not needed for system booting. The BIOS Setup Utility provides the setup options to enable or disable the Option ROMs at the PCIe slot level for the PCIe expansion slots and at the port level for the onboard NICs. These options can be found in the BIOS Setup Utility **Advanced → PCI Configuration** page (see Figure 3-28).

Figure 3-28   BIOS Setup Utility Advanced > PCI Configuration Page
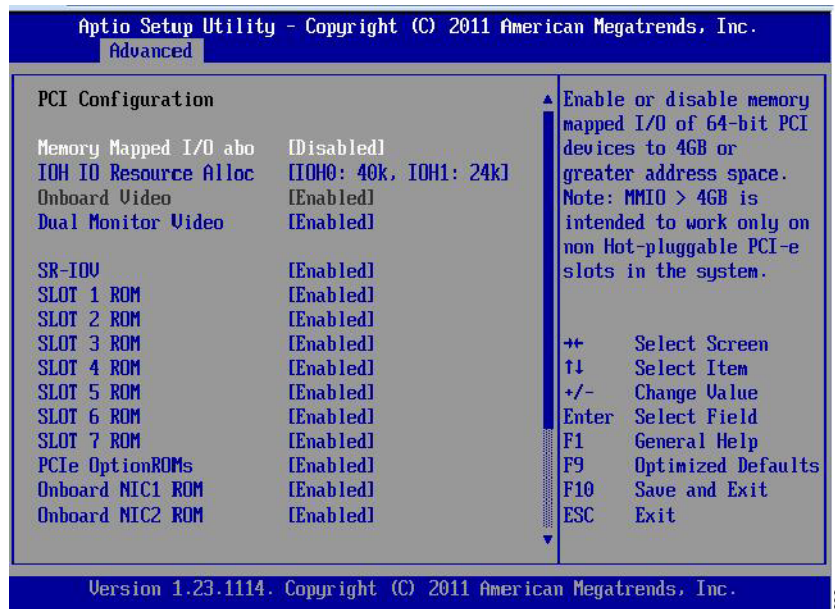
- **Guidelines for RAID controller booting:**

  When this server is configured in the factory, the RAID controllers are installed in PCIe Slot 3 or Slot 5 for single RAID controller configuration, or in both Slot 3 and Slot 5 for dual RAID controller configuration.

  If the server is configured to boot primarily from RAID storage, make sure that the option ROMs for Slot 3 and/or Slot 5 are enabled in the BIOS, depending your RAID controller configuration. If the RAID controller does not appear in the system boot order even with the option ROMs for Slot 3 and Slot 5 enabled, the RAID controller option ROM might not have sufficient memory space to execute. In that case, disable other option ROMs that are not needed for the system configuration to free up some memory space for the RAID controller option ROM.

- **Guidelines for onboard NIC PXE booting:**

  If the system is configured to primarily perform PXE boot from onboard NICs, make sure that the option ROMs for the onboard NICs to be booted from are enabled in the BIOS Setup Utility. Disable other option ROMs that are not needed to create sufficient memory space for the onboard NICs.

Resolving Insufficient 16-Bit I/O Space

The system has only 64 KB of legacy 16-bit I/O resources available. This 64 KB of I/O space is divided between two I/O Hubs (IOH0 and IOH1) in the system.

The default BIOS setting is to allocate 40 KB to IOH0 and 24 KB to IOH1. Every PCIe device that is connected to IOH0 has to share the 40 KB of I/O. Every PCIe device connected to IOH1 must share that 24 KB of I/O.

When a large number of PCIe cards are installed in the system, the system BIOS might not have sufficient I/O space for some PCIe devices. If the system BIOS is not able to allocate the required I/O resources for any PCIe devices, the following symptoms have been observed:

- The BIOS might appear to hang while initializing PCIe devices.

- The PCIe option ROMs might take excessive time to complete, which appears to lock up the system.

- PCIe boot devices might not be accessible from the BIOS.

- PCIe option ROMs might report initialization errors. These errors are seen before the BIOS hands control to the operating system.

- The keyboard might not work.

To work around this problem, rebalance the load on each IOH using the following methods:

1. Adjust the IOH IO Resource Allocation ratio. This option is included in the BIOS Setup Utility **Advanced** → **PCI Configuration** page (see Figure 3-28).

2. Physically remove any unused PCIe cards.

3. Physically rearrange the PCIe cards to create a balance between IOH0 and IOH1.

   In this server, the PCIe slots are connected to IOH0 and IOH1 as follows:

   - Slot 1: IOH 1
   - Slot 2: IOH 1
   - Slot 3: IOH 1
   - Slot 4: IOH 1
   - Slot 5: IOH 0
   - Slot 6: IOH 0
   - Slot 7: IOH 0

Replacing the RAID Controller Battery Backup Unit

This server supports installation of up to two LSI RAID controller battery backup units (BBUs).

Note This optional LSI BBU is available only when using the optional LSI 9260-8i SAS MegaRAID controller card. This BBU provides approximately 72 hours of battery backup for the disk write-back cache DRAM in the case of sudden power loss.

Note LSI recommends that you replace the LSI BBU once per year or after 1,000 recharge cycles, whichever comes first. Verify whether BBU replacement is required by looking in the CIMC. Log in to CIMC for the server, then click **Server—Inventory—Storage—Battery Backup Unit**. If the Battery Replacement Required field says, "True," then you must purchase a replacement BBU and replace it.

Warning **There is danger of explosion if the battery is replaced incorrectly. Replace the battery only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.**
Statement 1015

To replace the RAID controller BBU, follow these steps:

Step 1 Remove a BBU (see Figure 3-29).

    a. Power off the server as described in the "Shutting Down and Powering Off the Server" section on page 3-7.

    b. Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.

Caution If you cannot safely view and access the component, remove the server from the rack.

    c. Remove the top cover as described in the "Removing and Replacing the Server Top Cover" section on page 3-8.

    d. Disconnect the cable that is attached to the BBU.

    e. Grasp the plastic BBU holder and slide it upward to free its slotted holes from the two mounting pegs on the inner chassis wall.

    f. Pull the retainer clip on the plastic BBU holder away from the BBU and then lift the BBU from the holder.

Step 2 Install a new BBU:

    a. Set the new BBU into the plastic BBU holder and push it flat so that retaining clip closes over the BBU.

    b. Insert the plastic BBU holder against the inner chassis wall and align the two holes in the back of the holder with the two pegs on the chassis wall.

    c. Push the plastic BBU holder downward on the two mounting pegs until it stops.

    d. Connect the cable from the RAID controller to the new BBU.

    e. Replace the top cover.

    f. Replace the server in the rack, replace cables, and then power on the server by pressing the **Power** button.

Figure 3-29   *Removing the BBU*
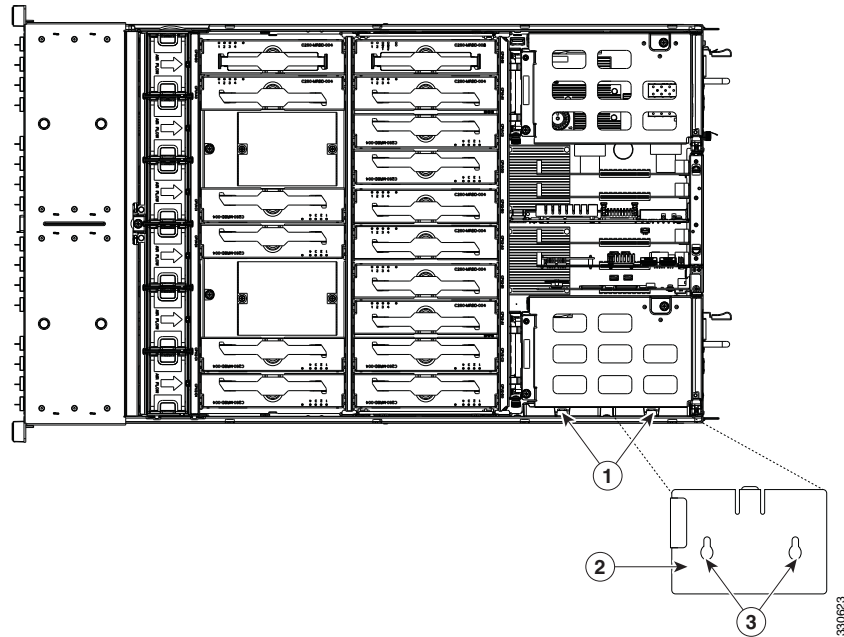
1	BBUs (up to 2)	**3**	Slotted holes for mounting pegs
2	Plastic BBU holder rear view		

Installing a Trusted Platform Module

The trusted platform module (TPM) is a small circuit board that attaches to a motherboard socket. The socket location is on the motherboard, underneath the cage for power supply 1.

✎
Note   For security purposes, the TPM is installed with a one-way screw. It cannot be removed with a standard screwdriver.

To install a trusted platform module (TPM), follow these steps:

Step 1   Prepare the server for component installation.

    a.   Power off the server as described in the "Shutting Down and Powering Off the Server" section on page 3-7.

    b.   Slide the server out the front of the rack far enough so that you can remove the top cover. You might have to detach cables from the rear panel to provide clearance.

⚠
Caution   If you cannot safely view and access the component, remove the server from the rack.

    c.   Remove the top cover as described in the "Removing and Replacing the Server Top Cover" section on page 3-8.

    d.   Remove the PCIe riser assembly that is in PCIe slot 1 (see Figure 3-26). See Replacing a PCIe Riser Assembly, page 3-35 for details.

    e.   Remove power supply 1 from its cage. See Replacing Power Supplies, page 3-59 for details.

Step 2   Install a TPM (see Figure 3-30):

    a.   Locate the TPM socket on the motherboard, as shown in Figure 3-30.

    b.   Align the connector that is on the bottom of the TPM circuit board with the motherboard TPM socket. Align the screw hole and standoff on the TPM board with the screw hole adjacent to the TPM socket.

    c.   Push down evenly on the TPM to seat it in the motherboard socket.

    d.   Install the single one-way screw that secures the TPM to the motherboard.

    e.   Replace power supply 1 to the empty bay.

    f.   Replace the PCIe riser assembly to PCIe slot 1.

    g.   Replace the top cover.

    h.   Replace the server in the rack, replace cables, and then power on the server by pressing the **Power** button.

Step 3   Enable the TPM:

    a.   Watch during bootup for the F2 prompt, and then press **F2** to enter BIOS setup.

    b.   Log into the BIOS Setup utility with your BIOS Administrator password.

    c.   On the BIOS Setup utility screen, select the **Advanced** tab.

    d.   Select **Trusted Computing** to open the TPM Security Device Configuration screen.

    e.   Change TPM SUPPORT to **Enabled**.

    f.   Press **F10** to save your settings and reboot the server.

**Step 4**   Verify that the TPM is now enabled.

   a.   Watch during bootup for the F2 prompt, and then press **F2** to enter BIOS setup.

   b.   Log into the BIOS Setup utility with your BIOS Administrator password.

   c.   Select the **Advanced** tab.

   d.   Select **Trusted Computing** to open the TPM Security Device Configuration screen.

   e.   Verify that TPM SUPPORT is Enabled.

> **Note**   If you want to use the Intel Trusted Execution Technology (TXT) feature, it must be enabled in the server BIOS as described in Enabling the Intel Trusted Execution Technology (TXT) Feature For the TPM, page 3-57.

Figure 3-30   TPM Socket Location on Motherboard
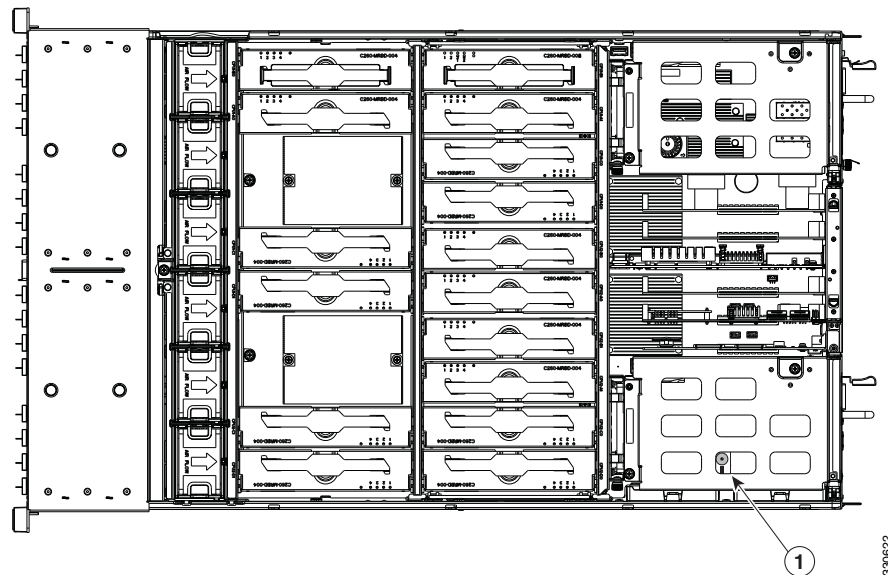
| **1** | TPM socket and screw hole on motherboard (visible through power supply cage with PCIe riser and power supply removed) | | |

Enabling the Intel Trusted Execution Technology (TXT) Feature For the TPM

Intel TXT provides greater protection for information that is used and stored on the business server. A key aspect of that protection is the provision of an isolated execution environment and associated sections of memory where operations can be conducted on sensitive data, invisibly to the rest of the system. Likewise, Intel TXT provides for a sealed portion of storage where sensitive data such as encryption keys can be kept, helping to shield them from being compromised during an attack by malicious code.

To enable the TXT feature, follow these steps:

Step 1   Verify that a TPM is now installed and enabled in the server:

   a.   Either attach a VGA monitor and USB keyboard to the server, or log in remotely to the CIMC interface of the server and open a virtual KVM console window.

   b.   Reboot the server.

   c.   Watch during bootup for the F2 prompt, and then press **F2** to enter BIOS setup.

   d.   Log in to the BIOS Setup utility with your BIOS Administrator password.

> **Note**   You must be logged in as the BIOS administrator to perform this procedure. If you have not done so already, set a BIOS administrator password on the Security tab of the BIOS Setup utility.

   e.   Select the **Advanced** tab.

   f.   On the Advanced tab, select **Trusted Computing** to open the TPM Security Device Configuration screen.

   g.   Verify that **TPM SUPPORT** is **Enabled**. If it is not, set TPM SUPPORT to Enabled.

   h.   Press **Escape** to return to the BIOS Setup utility **Advanced** tab.

Step 2   Enable the Intel Trusted Execution Technology (TXT) feature:

   a.   On the Advanced tab, select **Intel TXT(LT-SX) Configuration** to open the Intel TXT(LT-SX) Hardware Support screen.

> **Note**   The Intel Trusted Execution Technology feature can be enabled only when the server has a TPM installed on the TPM header.

   b.   Set **TXT Support** to **Enabled**.

Step 3   On the same screen, verify that the Intel Virtualization Technology (VT) and the Intel VT for Directed I/O (VT-d) features are enabled (the factory default).

   a.   On the Intel TXT(LT-SX) Hardware Support screen, verify that **VT-d Support** and **VT Support** are both listed as **Enabled**.

   –   If they are already enabled, skip to Step 4.

   –   If VT-d Support and VT Support are not enabled, continue with the next steps to enable them.

   b.   Press **Escape** to return to the BIOS Setup utility **Advanced** tab.

   c.   On the Advanced tab, select **Processor Configuration** to open the Processor Configuration screen.

   d.   Set **Intel (R) VT** and **Intel (R) VT-d** to Enabled.

Step 4   Press **F10** to save your changes and exit the BIOS Setup utility.

Step 5   Verify that the Intel TXT, VT, and VT-d features are enabled:

   a.   Reboot the server.

   b.   Watch during bootup for the F2 prompt, and then press **F2** to enter BIOS setup.

   c.   Select the **Advanced** tab.

   d.   Select **Intel TXT(LT-SX) Configuration** and verify that TXT Support, VT-d Support, and VT Support are Enabled.

Replacing Power Supplies

The server can have one or two power supplies. When two power supplies are installed they are redundant as 1+1.

To replace or install a power supply, follow these steps:

Note   If you have ordered a server with power supply redundancy (two power supplies), you do not have to power off the server to replace power supplies because they are redundant as 1+1.

Step 1   Remove the power supply that you are replacing or a blank panel from an empty bay (see Figure 3-31):

  a.   Perform one of the following actions:

    –   If your server has only one power supply, shut down and power off the server as described in the "Shutting Down and Powering Off the Server" section on page 3-7.

    –   If your server has two power supplies, you do not have to shut down the server.

  b.   Remove the power cord from the power supply that you are replacing.

  c.   Grasp the power supply handle while pinching the release lever towards the handle.

  d.   Pull the power supply out of the bay.

Step 2   Install a new power supply:

  a.   Grasp the power supply handle and insert the new power supply into the empty bay.

  b.   Push the power supply into the bay until the release lever locks.

  c.   Connect the power cord to the new power supply.

  d.   If you shut down the server, press the **Power** button to return the server to main power mode.

Figure 3-31   ***Removing and Replacing Power Supplies***
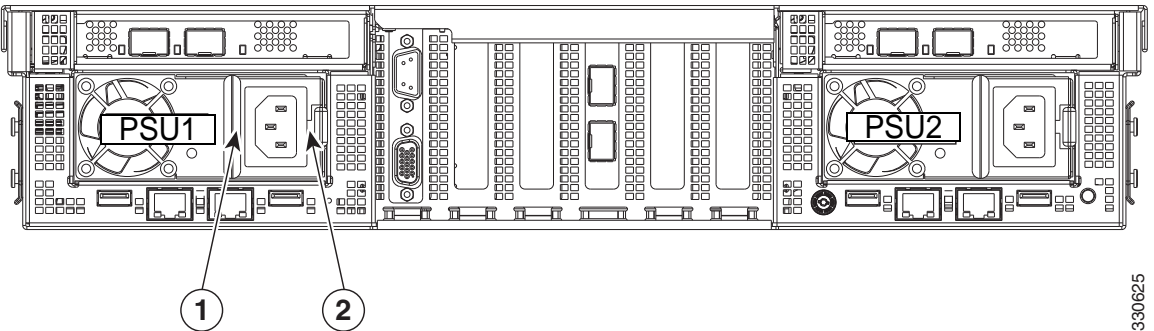
1	Power supply handle	2	Power supply release lever

Enabling or Disabling the Internal USB Port

The factory default is for all USB ports on the server to be enabled. However, the internal USB port can be enabled or disabled in the server BIOS. To enable or disable the internal USB port, follow these steps:

Step 1   Enter the BIOS Setup utility by pressing the **F2** key when prompted during bootup.

Step 2   Navigate to the **Advanced** tab.

Step 3   On the Advanced tab, select **USB Configuration**.

Step 4   On the USB Configuration page, select **USB Ports Configuration**.

Step 5   Scroll to **USB Port: Internal**, press **Enter**, and then select either Enabled or Disabled from the pop-up menu.

Step 6   Press F10 to save and exit the utility.

Server Specifications

This appendix lists the technical specifications for the Cisco UCS C260 server and includes the following sections:

Physical Specifications

Table A-1 lists the physical specifications for the server.

Table A-1   Physical Specifications

Description	Specification
Height	3.5 in (89 mm)
Width	17.6 in (447 mm)
Length (including slide-rail brackets)	31.5 in (800 mm)
Weight (maximum configuration)	83 lbs (37.65 kg)
Weight (maximum configuration, including slide rail brackets and cable management arm)	92 lbs (41.70 kg)

Environmental Specifications

Table A-2 lists the environmental specifications for the server.

Table A-2   Environmental Specifications

Description	Specification
Temperature, operating	10ºC to 35ºC (50ºF to 95ºF)
Temperature, non-operating	-40ºC to 70ºC (-40ºF to 158ºF)
Humidity, non-operating	95%, non-condensing at temperatures of 25ºC (77ºF) to 30ºC (86ºF)
Altitude	-30m to 1500m (-100ft to 5000ft)

Power Specifications

Table A-3 lists the specifications for each power supply.

Table A-3   Power Supply Specifications

Description	Specification
AC input voltage	200 to 240 VAC nominal (Range: 180 to 264 VAC)
Low AC input voltage (limited to 800W system configurations)	100 to 120 VAC nominal (Range: 90 to 132 VAC)
AC input frequency	50 to 60 Hz nominal (Range: 47 to 63 Hz)
Maximum AC-input current	10A
Maximum output power for each power supply	1200 W (up to two power supplies can be installed)
Power supply output voltage	Main power: 12 VDC Standby power: 12 VDC

You can get more specific power information for your exact server configuration by using the Cisco UCS Power Calculator:

http://www.cisco.com/assets/cdc_content_elements/flash/dataCenter/cisco_ucs_power_calculator/

Power Cord Specifications

This appendix provides supported power cable specifications.

Supported Power Cords and Plugs

Each power supply has a separate power cord. Standard power cords or jumper power cords are available for connection to the server. The jumper power cords, for use in racks, are available as an optional alternative to the standard power cords.

Note Only the approved power cords or jumper power cords provided with the server are supported.

Table B-1 lists the power cords for the server power supplies.

Table B-1 Supported Power Cords for the Server

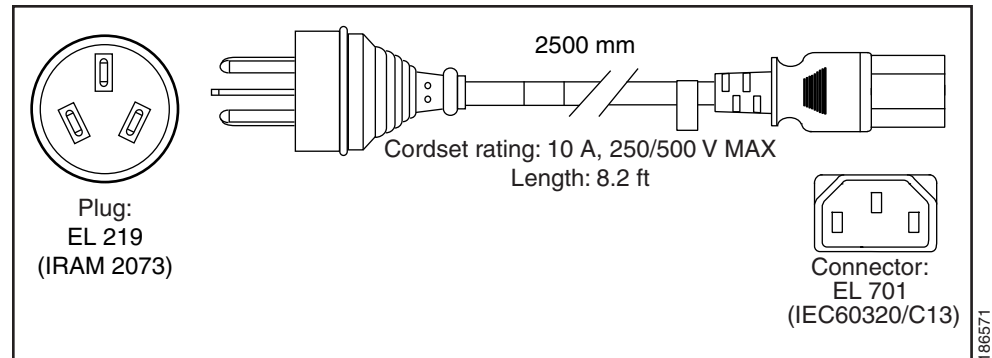| Description	Length		Power Cord Reference Illustration
	Feet	Meters	
SFS-250V-10A-AR Power Cord, 250 VAC 10 A IRAM 2073 Plug Argentina	8.2	2.5	Figure B-1
CAB-9K10A-AU 250 VAC 10 A 3112 Plug, Australia	8.2	2.5	Figure B-2
SFS-250V-10A-CN Power Cord, 250 VAC 10 A GB 2009 Plug China	8.2	2.5	Figure B-3
CAB-9K10A-EU Power Cord, 250 VAC 10 A M 2511 Plug Europe	8.2	2.5	Figure B-4
SFS-250V-10A-ID Power Cord, 250 VAC 16A EL-208 Plug South Africa, United Arab Emirates, India	8.2	2.5	Figure B-5
SFS-250V-10A-IS Power Cord, 250 VAC 10 A SI32 Plug Israel	8.2	2.5	Figure B-6

Table B-1   Supported Power Cords for the Server (continued)

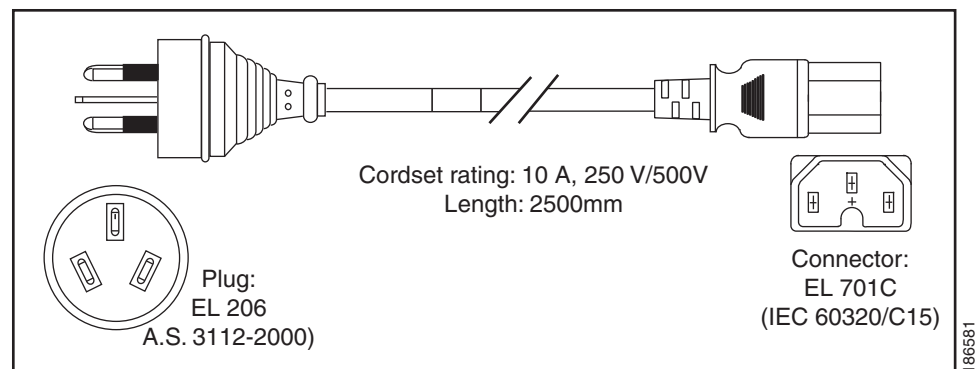| Description	Length		Power Cord Reference Illustration
	Feet	**Meters**	
CAB-9K10A-IT Power Cord, 250 VAC 10 A CEI 23-16 Plug Italy	8.2	2.5	Figure B-7
CAB-9K10A-SW Power Cord, 250 VAC 10 A MP232 Plug Switzerland	8.2	2.5	Figure B-8
CAB-9K10A-UK Power Cord, 250 VAC 10 A BS1363 Plug (13 A fuse) United Kingdom	8.2	2.5	Figure B-9
CAB-AC-250V/13A Power Cord, 250 VAC 13 A IEC60320 Plug North America	6.6	2.0	Figure B-10
CAB-N5K6A-NA Power Cord, 250 VAC 13 A NEMA 6-15 Plug, North America	8.2	2.5	Figure B-11
CAB-9K12A-NA Power cord, 125 VAC, 13 A, NEMA 5-15 Plug North America	8.2	2.5	Figure B-12
CAB-C13-CBN Cabinet Jumper Power Cord, 250 VAC 10 A, C13-C14 Connectors	2.2	0.68	Figure B-13
CAB-C13-C14-2M Cabinet Jumper Power Cord, 250 VAC 10 A, C13-C14 Connectors	6.6	2.0	Figure B-14
CAB-C13-C14-AC Cabinet Jumper Power Cord, 250 VAC 10 A, C13-C14 Connectors	9.8	3.0	Figure B-15

AC Power Cord Illustrations

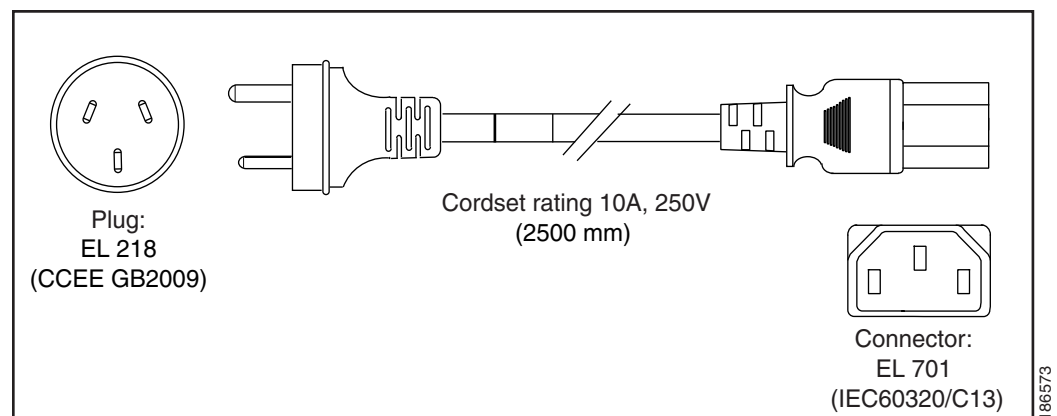This section includes the AC power cord illustrations. See Figure B-1 through Figure B-15.

Figure B-1   SFS-250V-10A-AR

Plug:
EL 219
(IRAM 2073)

2500 mm

Cordset rating: 10 A, 250/500 V MAX
Length: 8.2 ft

Connector:
EL 701
(IEC60320/C13)

186571

Figure B-2   CAB-9K10A-AU

Cordset rating: 10 A, 250 V/500V
Length: 2500mm

Plug:
EL 206
A.S. 3112-2000)

Connector:
EL 701C
(IEC 60320/C15)

186581

Figure B-3   SFS-250V-10A-CN

Plug:
EL 218
(CCEE GB2009)

Cordset rating 10A, 250V
(2500 mm)

Connector:
EL 701
(IEC60320/C13)

186573

Figure B-4   *CAB-9K10A-EU*

Plug:
M2511

Cordset rating: 10A/16 A, 250 V
Length: 8 ft 2 in. (2.5 m)

Connector:
VSCC15

186576

Figure B-5   *SFS-250V-10A-ID*

Plug:
EL 208

Cordset rating 16A, 250V
(2500mm)

Connector:
EL 701

187490

Figure B-6   *SFS-250V-10A-IS*

Plug:
EL 212
(SI-32)

Cordset rating 10A, 250V/500V MAX
(2500 mm)

Connector:
EL 701B
(IEC60320/C13)

186574

Figure B-7 **CAB-9K10A-IT**

Plug:
I/3G
(CEI 23-16)

Cordset rating: 10 A, 250 V
Length: 8 ft 2 in. (2.5 m)

Connector
C15M
(EN60320/C15)

186575

Figure B-8 **CAB-9K10A-SW**

Plug:
MP232-R

Cordset rating: 10 A, 250 V
Length: 8 ft. 2 in (2.5 m)

Connector:
IEC 60320 C15
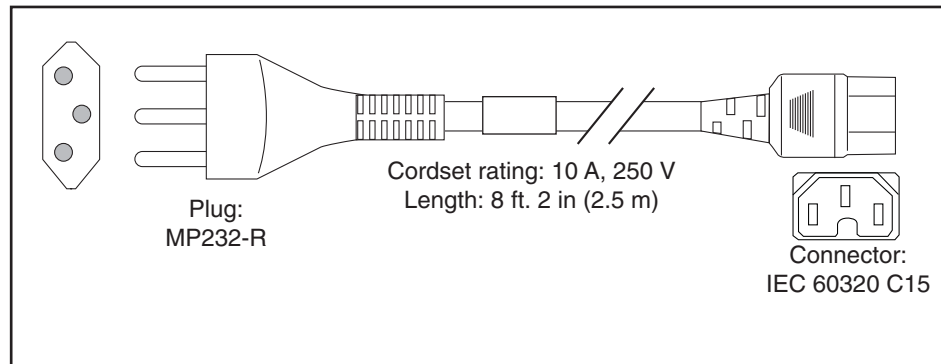
186578

Figure B-9 **CAB-9K10A-UK**

Plug:
EL 210
(BS 1363A) 13 AMP fuse
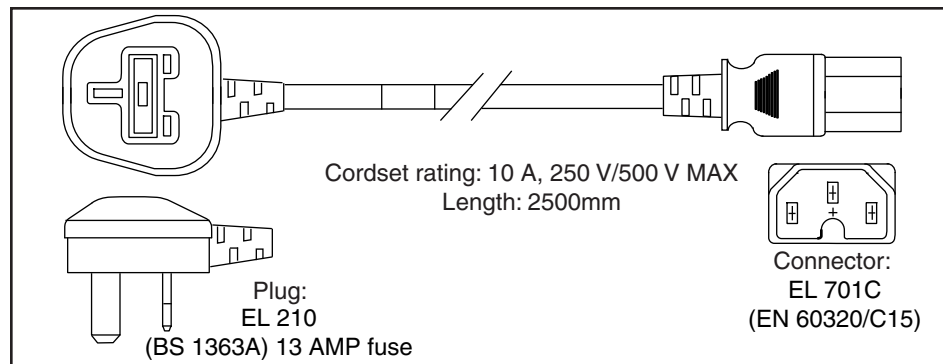
Cordset rating: 10 A, 250 V/500 V MAX
Length: 2500mm

Connector:
EL 701C
(EN 60320/C15)

186580

Figure B-10   *CAB-AC-250V/13A*

Cordset rating 13A, 250V
(6.6 feet) (79±2m)

Plug:
EL312MoldedTwistlock
(NEMA L6-20)

Connector:
EL 701
(IEC60320/C13)

186568

Figure B-11   *CAB-N5K6A-NA*

Plug: NEMA 6-15P

Cordset rating: 10 A, 250 V
Length: 8.2 ft

Connector:
IEC60320/C13

186570

Figure B-12   *CAB-9K12A-NA*

Cordset rating 13A, 125V
(8.2 feet) (2.5m)

Plug:
NEMA 5-15P

Connector:
IEC60320/C15

192260
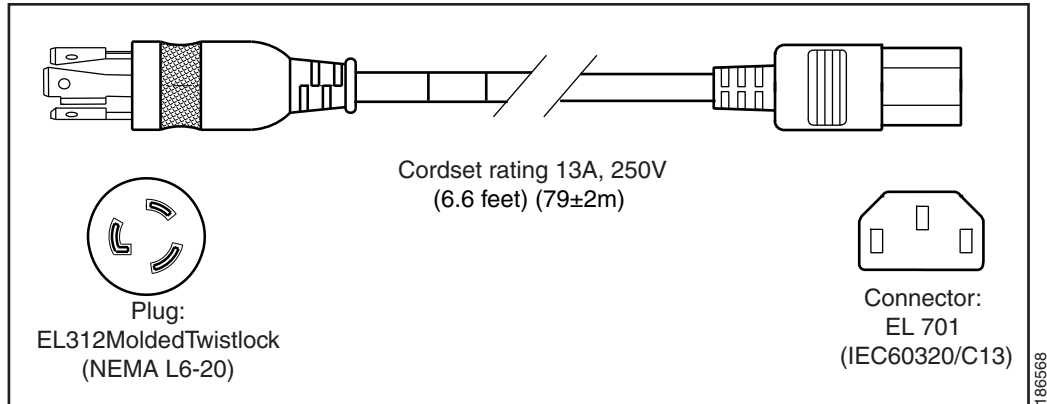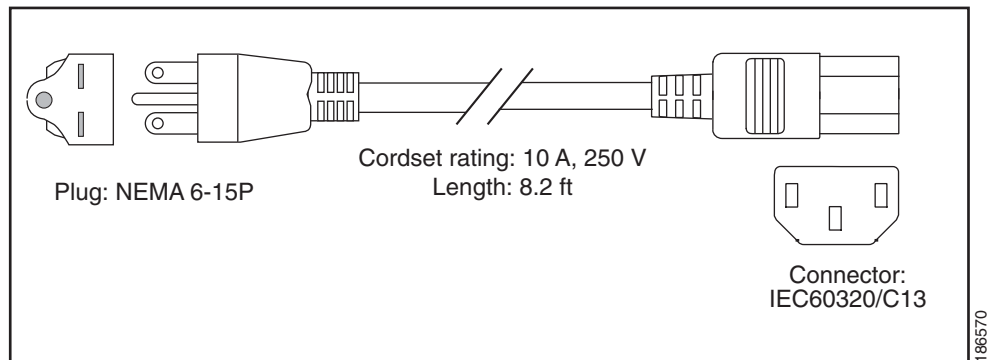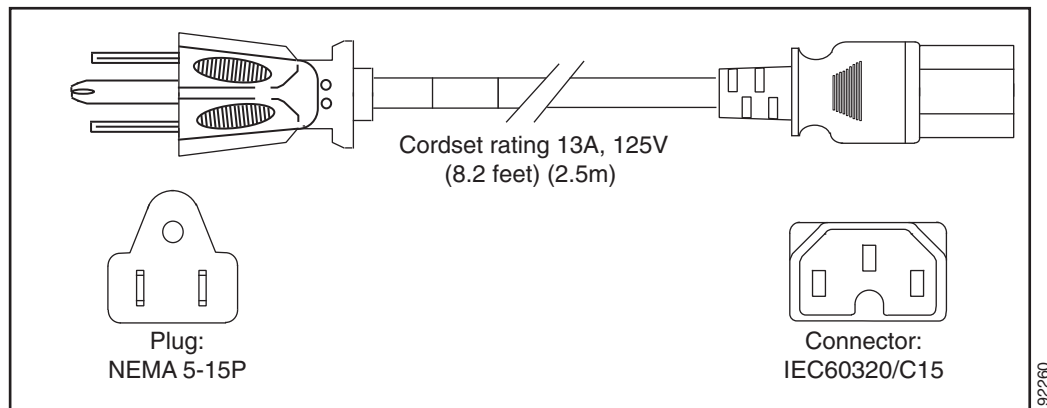
Figure B-13   *CAB-C13-CBN, Jumper Power Cord (0.68 m)*

Cordset rating 10A, 250V
(686mm)

Plug:
SS10A

Connector:
HS10S

186569
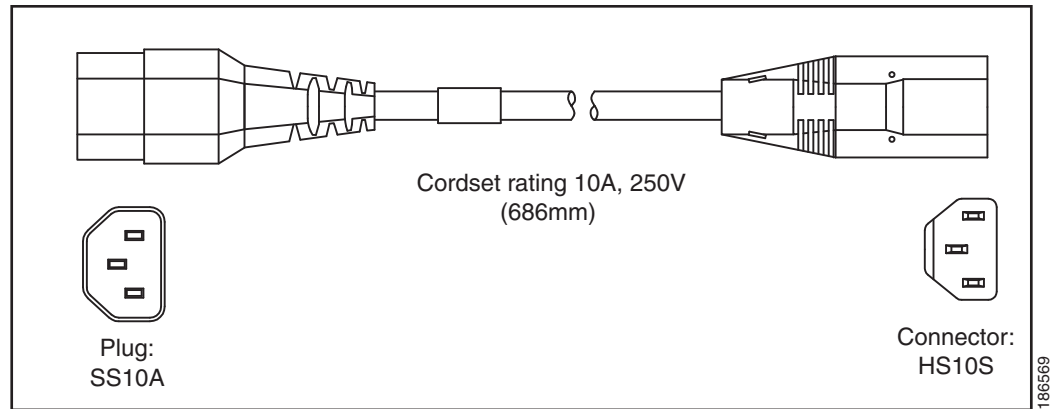
Figure B-14   *CAB-C13-C14-2M, Jumper Power Cord (2 m)*

Cordset rating 10A, 250V
(2.0 m)

Plug:
SS10A

Connector:
HS10S

336014
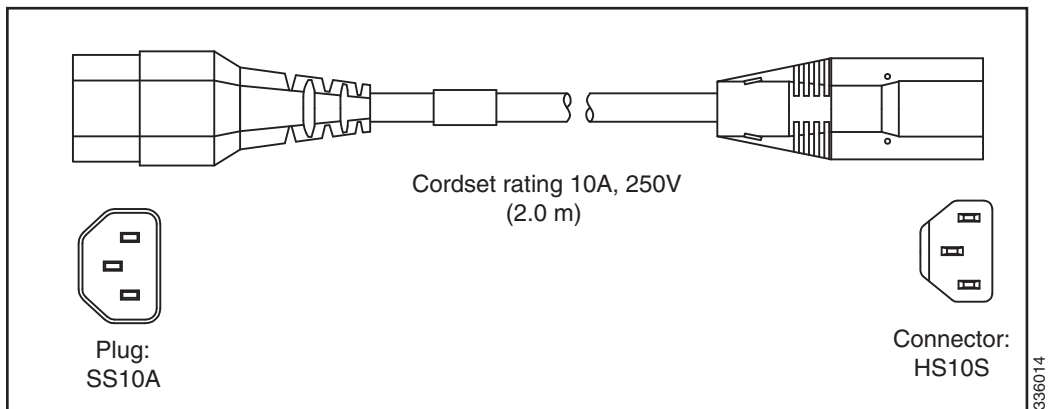
Figure B-15   *CAB-C13-C14-AC, Jumper Power Cord (3 m)*

Cordset rating 10A, 250V
(3.0 m)

Plug:
SS10A

Connector:
HS10S

336013
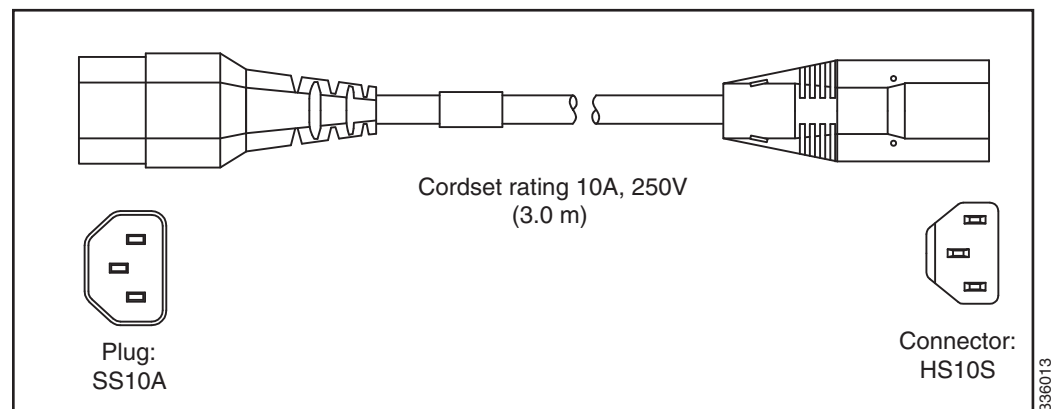
RAID Controller Considerations

This appendix provides RAID controller information, and it includes the following sections:

- Supported RAID Controllers and Required Cables, page C-1
- Battery Backup Unit, page C-2
- Mixing Drive Types in RAID Groups, page C-2
- RAID Controller Cabling, page C-2
- Restoring RAID Configuration After Replacing a RAID Controller, page C-6
- For More Information, page C-7

Supported RAID Controllers and Required Cables

This server supports the RAID controller options and cable requirements shown in Table C-1.

> **Note** Do not mix controller types in the server.

Table C-1   Cisco UCS C260 Server Supported RAID Options

Controller	Style	Max. Internal Drives	SAS	SATA	Opt. BBU	RAID Levels	Required Cables
LSI MegaRAID SAS 9261-8i	PCIe	8[1] or 16 with expander[2]	Yes[3]	Yes	Yes	0, 1, 5, 6, 10, 50, 60	2 or 4 SAS[4] UCSC-RC-1M-C260 or UCSC-RC-P8M-C260

1. When using the nonexpander-style transition card, each controller can support 8 drives. You can install two controllers and two nonexpander transition cards to control 16 drives.
2. When using two expander-style transition card, one controller can control 16 drives.
3. You can mix SAS and SATA drives when using an LSI MegaRAID card. However, you cannot mix SAS and SATA drives within a volume.
4. The number of cables required varies, depending on how many controllers and transition cards are used. See Mixing Drive Types in RAID Groups, page C-2.

Battery Backup Unit

This server supports installation of two LSI RAID battery backup units (BBUs). The units mount to holders on the chassis wall (see Replacing the RAID Controller Battery Backup Unit, page 3-54).

This BBU provides approximately 72 hours of battery backup for the disk write-back cache DRAM in the case of sudden power loss.

Mixing Drive Types in RAID Groups

Table C-2 lists the technical capabilities for mixing hard disk drive (HDD) and solid state drive (SSD) types in a RAID group. However, see the best practices recommendations that follow for the best performance.

Table C-2   Drive Type Mixing in RAID Groups

Mix of Drive Types in RAID Group	Allowed?
SAS HDD + SATA HDD	Yes
SAS SSD + SATA SSD	Yes
HDD + SSD	No

Best Practices For Mixing Drive Types in RAID Groups

For the best performance, follow these guidelines:

- Use either all SAS or all SATA drives in a RAID group.
- Use the same capacity for each drive in the RAID group.
- Never mix HDDs and SSDs in the same RAID group.

RAID Controller Cabling

The maximum two supported RAID controller cards should be populated in PCIe slots in the following order (see Figure 3-26 on page 3-45):

1. PCIe slot 3
2. PCIe slot 5

Refer to the following examples for cable routing guidelines:

- Example 1—One Nonexpander and One RAID Controller With Eight Drives, page C-3
- Example 2—Two Nonexpanders and Two RAID Controllers With 16 Drives, page C-4
- Example 3—Two Expanders and One RAID Controller With Sixteen Drives, page C-5

For more information about transition cards, see Replacing a Modular Drive Bay Assembly, page 3-14.

Example 1—One Nonexpander and One RAID Controller With Eight Drives

Figure C-1 shows an example of a server that is using one RAID controller in PCIe slot 3 and a *nonexpander* transition card to control eight drives in the modular drive bay.

Two RAID cables are required (1 UCSC-RC-1M-C260 and 1 UCSC-RC-P8M-C260).

- Slot 3 RAID Controller to bay 1 drives 1–4:

  The blue line is a 0.8m cable (UCSC-RC-P8M-C260) from the RAID controller SAS 0 connector to the nonexpander connector for PORT 1– 4.

- Slot 3 RAID Controller to bay 1 drives 5–8:

  The red line is a 1m cable (UCSC-RC-1M-C260) from the RAID controller SAS 1 connector to the nonexpander connector for PORT 5–8.

- The green line is the cable from the RAID controller to an optional battery backup unit.

Figure C-1   RAID Controller Cabling Guidelines, Nonexpander Transition Card
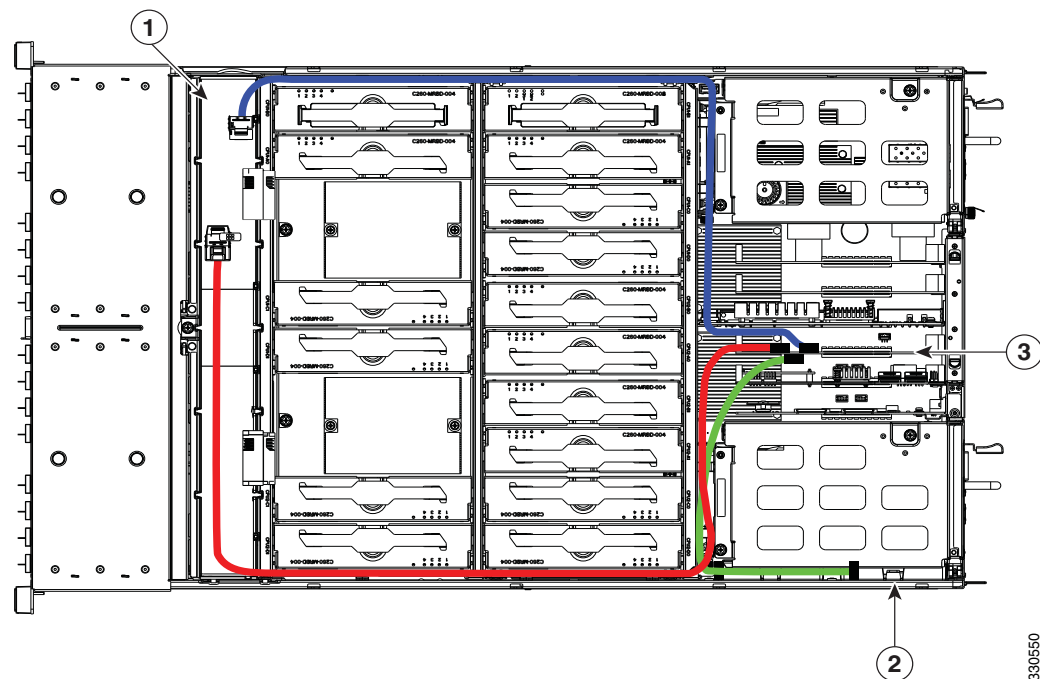
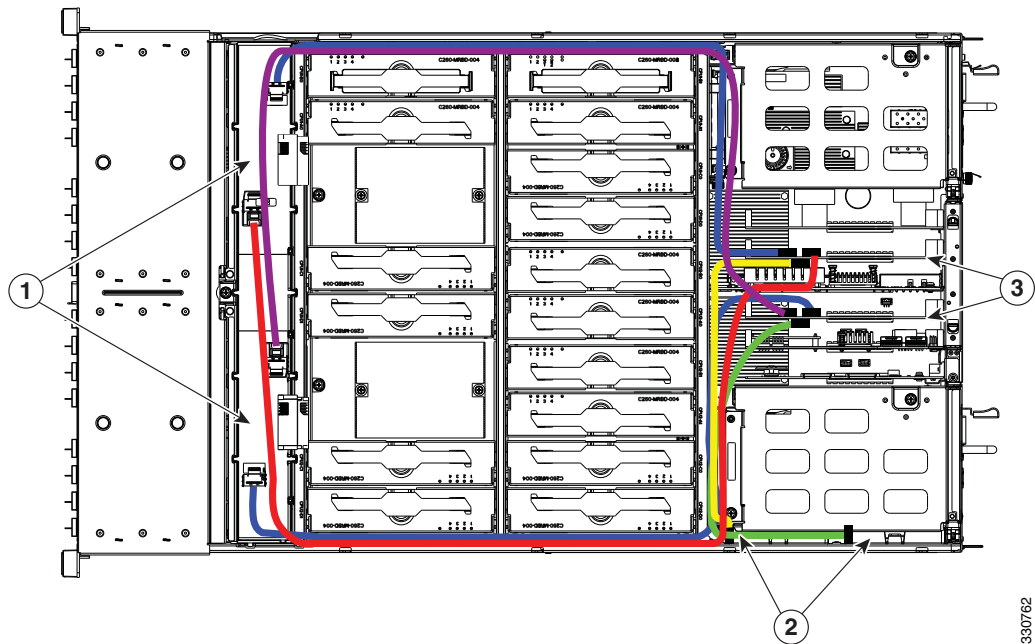| 1	Nonexpander transition card (shown with fan tray removed)	3	RAID controller card in PCIe slot 3
2	Battery backup unit (mounted to chassis inner wall)		–

Example 2—Two Nonexpanders and Two RAID Controllers With 16 Drives

Figure C-2 shows an example of a server that is using two RAID controllers in PCIe slots 3 and 5 and two *nonexpander* transition cards to control eight drives in each of the two modular drive bays.

Four RAID cables are required (2 x UCSC-RC-1M-C260 and 2 x UCSC-RC-P8M-C260).

- Slot 5 RAID Controller to bay 1 drives 1–4:

  The upper blue line is a 0.8m cable (UCSC-RC-P8M-C260) from the Slot 5 RAID controller SAS 0 connector to the nonexpander connector for PORT 1–4.

- Slot 5 RAID Controller to bay 1 drives 5–8:

  The red line is a 1m cable (UCSC-RC-1M-C260) from the Slot 5 RAID controller SAS 1 connector to the nonexpander connector for PORT 5–8.

- Slot 3 RAID Controller to bay 2 drives 1–4:

  The violet line is a 1m cable (UCSC-RC-1M-C260) from the Slot 3 RAID controller SAS 0 connector to the nonexpander connector for PORT 1–4.

- Slot 3 RAID Controller to bay 2 drives 5–8:

  The lower blue line is a 0.8m cable (UCSC-RC-P8M-C260) from the Slot 3 RAID controller SAS 1 connector to the nonexpander connector for PORT 5–8.

- The green and yellow lines are the cables from the RAID controllers to their respective battery backup units.

Figure C-2   RAID Controller Cabling Guidelines, Two Nonexpanders and Two Controllers

1	Transition cards, nonexpander version (shown with fan tray removed)	3	RAID controller cards in PCIe slots 3 and 5
2	Battery backup units (2, mounted to the inner chassis wall)		–

Example 3—Two Expanders and One RAID Controller With Sixteen Drives

Figure C-3 shows an example of a server that is using one RAID controller in PCIe slot 3 and two *expander* transition cards to control eight drives in each of the two modular drive bays.

Two RAID cables are required (2 x UCSC-RC-P8M-C260).

- Slot 3 RAID Controller to bay 1 drives 1–8:

  The upper blue line is a 0.8m cable (UCSC-RC-P8M-C260) from the RAID controller SAS 0 connector to the first expander connector A (for drives 1–8).

- Slot 3 RAID Controller to bay 2 drives 9–16:

  The lower blue line is a 0.8m cable (UCSC-RC-P8M-C260) from the RAID controller SAS 1 connector to the second expander connector B (for drives 9–16).

- The green line is a cable from the RAID controller to the battery backup unit.

Figure C-3   RAID Controller Cabling Guidelines, Two Expanders and One Controller
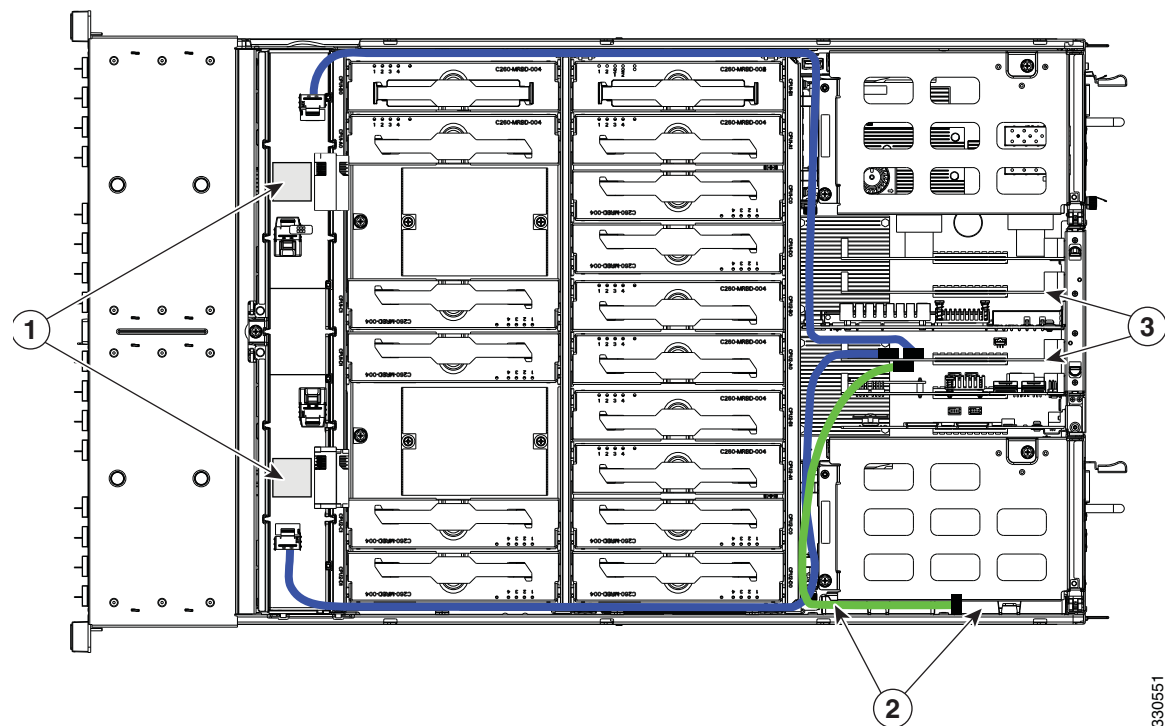
1	Expander transition cards (shown with fan tray removed)	**3**	RAID controller card in PCIe slot 3
2	Battery backup unit (mounted to the inner chassis wall)		–

Restoring RAID Configuration After Replacing a RAID Controller

When you replace a RAID controller, the RAID configuration that is stored in the controller is lost. To restore your RAID configuration to your new RAID controller, follow these steps.

Step 1 Replace your RAID controller. See Replacing a PCIe Card in a Motherboard Slot, page 3-48.

Step 2 If this was a full chassis swap, replace all drives into the drive bays, in the same order that they were installed in the old chassis.

Step 3 Reboot the server and watch for the prompt to press F.

Note For newer RAID controllers, you are not prompted to press F. Instead, the RAID configuration is imported automatically. In this case, skip to Step 6.

Step 4 Press **F** when you see the following on-screen prompt:

```
Foreign configuration(s) found on adapter.
Press any key to continue or 'C' load the configuration utility,
or 'F' to import foreign configuration(s) and continue.
```

Step 5 Press any key (other than C) to continue when you see the following on-screen prompt:

```
All of the disks from your previous configuration are gone. If this is
an unexpected message, then please power of your system and check your cables
to ensure all disks are present.
Press any key to continue, or 'C' to load the configuration utility.
```

Step 6 Watch the subsequent screens for confirmation that your RAID configuration was imported correctly.

- If you see the following message, your configuration was successfully imported. The LSI virtual drive is also listed among the storage devices.

```
N Virtual Drive(s) found on host adapter.
```

- If you see the following message, your configuration was not imported. This can happen if you do not press F quickly enough when prompted. In this case, reboot the server and try the import operation again wen you are prompted to press F.

```
0 Virtual Drive(s) found on host adapter.
```

For More Information

The LSI utilities have help documentation for more information about using the utilities.

For basic information about RAID and for using the utilities for the RAID controller cards, see the Cisco UCS Servers RAID Guide.

Full LSI documentation is also available:

LSI MegaRAID SAS Software User's Guide (for LSI MegaRAID)

http://www.lsi.com/DistributionSystem/AssetDocument/80-00156-01_RevH_SAS_SW_UG.pdf

Installation for Cisco UCS Integration

The Cisco UCS integration instructions have been moved to the integration guides found here:

Cisco UCS C-Series Server Integration with UCS Manager Guides

Refer to the guide that is for the version of Cisco UCS Manager that you are using.

Cisco UCS C260 Server Installation and Service Guide